INCIDENCE AND VARIOUS MODALITIES OF TREATMENT OF ORAL CAVITY MALIGNANCY IN GOVERNMENT RAJAJI HOSPITAL, MADURAI

Dissertation Submitted for

MS Degree (Branch I) General Surgery

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MADURAI MEDICAL COLLEGE, MADURAI.

CERTIFICATE

This is to certify that this dissertation titled **"INCIDENCE AND VARIOUS MODALITIES OF TREATMENT OF ORAL CAVITY MALIGNANCY IN GOVERNMENT RAJAJI HOSPITAL, MADURAI"**submitted by **DR.K.RAMACHANDRAN** to the faculty of General Surgery, **The Tamilnadu Dr. M.G.R. Medical University, Chennai** in partial fulfillment of the requirement for the award of MS degree Branch I General Surgery, is a bonafide research work carried out by him under our direct supervision and guidance from January 2011 to December 2012.

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DECLARATION

I**, DR.K.RAMACHANDRAN** solemnly declare that the dissertation titled **"INCIDENCE AND VARIOUS MODALITIES OF TREATMENT OF ORAL CAVITY MALIGNANCY IN GOVERNMENT RAJAJI HOSPITAL, MADURAI"**has been prepared by me. This is submitted to **The Tamilnadu Dr. M.G.R. Medical University, Chennai,** in partial fulfillment of the regulations for the award of MS degree (Branch I) General Surgery.

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INTRODUCTION

The oral cavity is made of complex structures that include the lips, tongue, gingivae, alveolus, and palate, floor of the mouth, mucous lining membrane and minor salivary glands. Like elsewhere in the body, these structures are made of fundamental tissues like blood vessels, nerves, bones, muscles, mucous membrane and skin. Malignancy may arise from any of these structures. The tissues of the oral cavity are exposed to a wide variety of infectious, chemical irritants and carcinogens and thus are liable to develop a wide variety of malignancies.[1-3]

Cancers of the oral cavity are notorious for their poor prognosis and outcome inspite of advances in treatment. Majority of the patients are seen in an advanced stage of presentation and treatment of these patients is very demanding which is predominantly by a multimodal approach. 95% of oral cavity cancers are squamous cell cancers[4] and it is one of the most important health burdens in India.

This study aims to analyze the incidence of oral cavity cancers in different age groups, sexes, occupation, sites, the association of risk factors with oral cancers, determine the average presenting stage and to discuss the various clinical presentations, modalities of treatment and their outcomes.

AIM OF THE STUDY

This study aims to

- To analyses the incidence (Age, Sex, Occupation, Site and Histology).
- To discuss the association of risk factors with oral cancers,
- To find presenting stage at the time of hospital visit,
- To discuss the various clinical presentation,
- Various modalities of treatment and their outcomes.

EPIDEMIOLOGY

Cancer of the oral cavity ranks among the ten most common cancers in the world with marked geographical variation.[4]2-6 % of all cancers diagnosed in US are oral cavity cancers which by themselves accounts for more than 30% of all head and neck cancers. In the US alone more than 30950 new cases of oral cavity cancer and 4000-8000 deaths are reported each year.[5]

Worldwide there is great variation in the incidence of oral cancer. In Western Europe and Australia the incidence closely resembles that of the US. The highest rates of oral cavity cancers are to be found in France, India, Brazil, central and Eastern Europe. Regional variation in the incidence of oral cancers is predominantly due to differing social customs.

Males are affected two to three times more than females. This can be attributed to their higher intake of tobacco, alcohol and sunlight exposure. This trend is presently changing as the number of women using tobacco is on the rise.[6]

Rates of oral cavity cancer are higher in India than any other country in Asia[7] and accounts for 40% of all cancers.[8]In parts of Asia the habit of chewing pan is thought to be the principal cause of oral cancer. The practice of reverse smoking which is common in India, contributes to the higher incidence of cancers of the hard palate**.** Females in India have a higher incidence of oral cavity cancers than males due to their practice of chewing betel nuts.[8]

The greatest number of cases in both males and females occur in the sixth decade of life. The mean age of diagnosis is 57 years in males and 52.5 years in females. The incidence among the young appears to be increasing. In Europe and North America the current trend of binge drinking and acute tobacco abuse has been observed to correlate with the rising incidence of cancer of the tongue in young people.[8]

ANATOMY OF THE ORAL CAVITY

The oral cavity encompasses the area from the vermillion border of the lip to an imaginary plane drawn at the junction of the hard palate and the soft palate superiorly, the circumvallate papillae and the anterior tonsillar pillars posteriorly.It comprises of seven anatomic subsites which are (Fig.1&2)

1. Lip

2. Buccal mucosa

3. Alveolar ridges

4. Floor of the mouth

5. Anterior two thirds of the tongue.

6. Retromolar trigone

7. Hard palate

Oral cavity is divided into an outer smaller portion called the 1). Vestibule and the inner larger part the 2).Oral cavity proper.

VESTIBULE

Vestibule of the mouth is a narrow space bounded externally by the lips and the cheeks and internally by the gums and the teeth. It communicates with the exterior through the oral fissure and with the mouth open it communicates

freely with the oral cavity proper. Even when the mouth is tightly closed there remains a small communication behind the third molar tooth.

The parotid duct opens on the inner surface of the cheek opposite the crown of the upper second molar tooth. Numerous labial and buccal glands situated in the sub mucosa of the lips and cheek open into the vestibule. Four to five molar glands situated in the buccopharyngeal fascia also open into the vestibule. Except for the teeth the entire vestibule is lined by mucous membrane. The mucous folds that pass from the lips to the gums are called the frenulum of the lip.

LIPS

The lips are mobile musculofibrous folds that surround the mouth externally and are lined externally by skin and internally by mucous membrane. Each lip is composed of skin, superficial fascia, orbicularis oris muscle, the submucosa containing mucous labial glands and mucous membrane. The lips are bound to the oral fissure where they meet laterally at the angle of the mouth. The inner surface of each lip is surrounded by a frenulum which ties it to the gum. The outer surface of each lip presents a vertical median groove the philtrum.The vermilion border represents the transitional border of the lips where the lips merge into the mucous membrane.

CHEEK

The cheeks are fleshy flaps forming a large part of each side of the face. Each cheek is composed of skin, superficial fascia containing some facial muscles, the parotid duct, mucous molar gland, vessels and nerves, buccinators covered by the buccopharyngeal fascia and pierced by the parotid duct, submucosa with mucous buccal glands and mucous membrane.

BUCCAL MUCOSA

The buccal mucosa includes the mucous covering of the lip and the cheeks extending from the line of contact of the opposing lip to the pterygomandibular raphe posteriorly.It extends to the line of attachment of the mucosa of the upper and lower alveolar ridge superiorly and inferiorly. The buccinators muscle forms the lateral margin of the vestibule. Cancer extending through the buccinator muscle can involve the buccal pad of fat, subcutaneous tissue and skin over the cheek.

ALVEOLAR RIDGE

The alveolar ridge includes the alveolar processes of the mandible, mucosa and the overlying mucosal covering. The lower alveolar ridge extends to the ascending ramus of the mandible posteriorly.The mucosal covering of the lower alveolar ridge extends from the buccal sulcus to the floor of mouth. The mucosal covering of the upper alveolar ridge extends from the buccal sulcus to

the hard palate posteriorly.The superior alveolar ridge extends posteriorly upto the superior end of the pterygopalatine arch. Cancers arising from the superior alveolar ridge extend easily into the maxillary antrum or the floor of the mouth because of the thin mucosal lining.

ORAL CAVITY PROPER

This is bound inferolaterally by the teeth the gums and the alveolar arches of the jaw. The roof is formed by the hard palate and the soft palate and the floor is occupied by the tongue which also extends posteriorly. Sublingual region is the region anteriorly below the tip of the tongue. The oral cavity communicates with the pharynx through the oropharyngeal isthmus (isthmus of fauces) which is bound superiorly by the soft palate, anterior by the tongue, and on each side by the palatoglossal arch.

GINGIVAE

The gingivae are composed of fibrous tissue covered with mucous membrane. The gingivae proper is firmly attached to the alveolar processes of the mandible, maxilla and the necks of the teeth; it is further divided into the superior and inferior lingual gingivae, maxillary and mandibular labial or buccal gingivae.The gingivae proper is pink stippled and keratinizing. The alveolar gingivae which are unattached are normally shiny red and non keratinizing.

FLOOR OF THE MOUTH

The floor of the mouth is a crescent shaped space extending from the lower alveolar ridge to the ventral surface of the tongue. It overlies the mylohyoid and the hyoglossus muscles. Its posterior limit is the anterior pillar. It is divided anteriorly by the lingual frenulum into right and left sides. Sublingual caruncles are found on each side of the frenulum, anteriorly and superior portions of the sublingual glands are located posterolaterally. A muscular ring formed by a pair of mylohyoid muscles extending from the manidble laterally to the hyoid bone medially supports the floor of mouth anteriorly. Medially the styloglossus, hyoglossus and genioglossus muscles are found between the mylohyoid muscle and mucosa of the floor of mouth. Floor of mouth is supported posteriorly by the hyoglossus muscle. The sublingual gland, lingual nerve and the hypoglossal muscle are lateral to the hyoglossus muscle, whereas the lingual artery lies medial to the muscle.

TONGUE

The mobile two thirds of the tongue anterior to the circumvallate papillae are considered to be part of the oral cavity; the oral tongue includes four anatomic areas-the tip, lateral border, ventral and the dorsal surfaces. Six paired muscles form the mobile tongue-three intrinsic and three extrinsic. Extrinsic muscles include genioglossus, hyoglossus and styloglossus. Intrinsic muscles include vertical, transverse and the lingual muscles. Extrinsic muscles primarily move

the body of the tongue while the intrinsic muscles shape the tongue during swallowing and speech.

RETROMOLAR TRIGONE

Retromolar trigone is the triangular area overlying the ascending ramus of the mandible. The base of the triangle is formed by the last molar tooth and the apex points towards the maxillary tuberosity. The base of the triangle is contiguous with the gingivobuccal sulcus laterally and the gingivolingual sulcus medially. The lateral side of the triangle is continuous with the buccal mucosa while the medial side continuous into the anterior tonsillar pillars. The retromolar trigone is tightly attached to the underlying mandible; it is not, unusual for bony invasion to occur even for early stage tumours.

HARD PALATE

This comprises of the primary palate formed by the fusion of the palatine processes of the maxilla, and a secondary palate formed by the fusion of the horizontal lamina of the palatine bones. The hard palate extends from the inner surface of the superior alveolar ridge to the posterior edge of the palatine bone. Although the dense mucoperiosteum of the palatine bone is relatively resistant to tumour invasion, several pathways allow for tumour spread beyond the hard palate. The primary palate and the secondary palate are fused at the incisive fossa which acts as a pathway into the nasal cavity. Likewise the greater

palatine fossa allows for tumour spread into the pterygopalatine fossa and skull base.

BLOOD SUPPLY OF THE ORAL CAVITY

The entire blood supply of the oral cavity is from the three branches of the external carotid artery. A branch of external carotid artery, the facial artery, supplies the cheek. Another branch of external carotid artery, the lingual artery supplies the tongue. The greater palatine artery, a branch of maxillary artery which emerges from the greater palatine foramen supplies the palate.

NERVE SUPPLY OF THE ORAL CAVITY

The trigeminal nerve takes care of the sensory supply of the mucous membrane of the cheek above by maxillary division and below by the mandible division.The lingual nerve supplies the anterior two thirds of the tongue. The trigeminal component carries general sensations while the chord tympani component carries taste sensations. All the muscles of tongue, both intrinsic and extrinsic are supplied by the hypoglossal nerve except the palatoglossus muscle which is supplied by pharyngeal plexus.

LYMPHATIC DRAINAGE

Lymphatic drainage of the oral cavity is predominantly to the submental, submandibular and upper deep cervical lymphnodes especially the jugulo

omohyoid. Lymphatics from the central part of lower lip, anterior part of the floor of mouth, anterior part of gums drain into the submental lymphnodes. The tip of the tongue drains bilaterally to the submental lymphnodes. Lymphatics from the upper lip, lateral parts of the lower lip, cheek ,rest of floor of mouth, upper gums and posterior parts of lower gums and anterior two thirds of the tongue except tip drains into submandibular group. The posterior one third of the tongue drains bilaterally into the jugulo omohyoid nodes. Ultimately the lymph from the tongue reaches the jugulo omohyoid nodes.Cheek also drains into the preauricular, buccal and mandibular nodes. Upper lip also drains into the preauricular and parotid nodes. Hard palate drains into retropharyngeal and upper deep cervical group of nodes.

PATTERN OF LYMPH NODE METASTASIS[9]

Level I: Includes nodes within the submental and submandibular triangle.

Ia: Nodes in the submental triangle which is bound bilaterally by the anterior bellies of digastrics, superiorly by the symphysis menti and inferiorly by the hyoid.

Ib: Includes the submandibular nodes which are bound anteriorly by the posterior bellies and posteriorly by the anterior bellies of either digastrics and superiorly by the body of the mandible.

Level II: Includes upper jugular chain of nodes

IIa: the jugulodigastric node which is anterior to the posterior border of sternocleidomastoid, posterior to posterior belly of digastrics, superior to the hyoid and inferior to the spinal accessory nerve.

IIb: nodes in the submuscular recess lying superior to spinal accessory nerve to the skull base.

Level III: Includes middle jugular nodes which lie inferior to hyoid, superior to cricoids, deep to the sternocleidomastoid along its posterior border and strap muscles medially.

Level IV: Includes the lower jugular nodes which lie inferior to cricoid and superior to the clavicle, deep to sternocleiomastoid along its posterior border to strap muscles medially.

Level V: Includes nodes in the posterior cervical triangle.

Va: lateral to posterior aspect of sternocleidomastoid, inferior and medial to splenius capitis and trapezius, superior to the spinal accessory nerve.

Vb: lateral to posterior aspect of sternocleidomastoid, medial to the trapezius, inferior to the spinal accessory nerve and superior to the clavicle.

Level VI: Includes nodes in the anterior triangle of necks bound on either side laterally by the strap muscles, superiorly by hyoid and inferiorly by the suprasternal notch.

Level VII: paratracheal nodes in the upper mediastinum which lie inferior to the suprasternal notch.

PHYSIOLOGY

1. Mastication

The tongue, teeth, palate and other structures help in digestion by making food easier to swallow.

2. Speech

Together with the pharynx it helps in speech by acting as a resonator.

3. Respiration

While the oral cavity has no major role to play during normal breathing, pathology may exaggerate its role as a conduit.

4. Taste

The taste buds are located in the tongue.

5. Absorption

The lining membrane of the mouth is highly permeable to lipid soluble substances and this fact can be used in the administration of certain drugs (e.g.; anginal, oral hypoglycaemic agents etc).

ETIOLOGY

TOBACCO:

The use of tobacco and tobacco related substances is strongly correlated with cancers of oral cavity. Tobacco smoke is known to have more than 300 carcinogens,[10]most importantly benzpyrene and tobacco specific nitrosamines which on absorption produce DNA adducts and interfere with DNA replication. Smoking is an independent risk factor associated with 80-90%of oral cavity cancers.[11-12] The relative risk of developing oral carcinoma is six to eight times more for smokers than for non smokers.[11-12]Cigars increase risk of cancer 4-20 times and smoking of just two cigars a day is considered equivalent to smoking a pack of cigarettes.[13] Pipe smoking is associated with cancer of the lip. This is attributed to temperature changes and permeability of the pipe stem.[15]Snuff causes hyperkeratosis, dysplasia and squamous cell carcinoma. Exposure to smokeless tobacco increases the risk of malignancy four fold, particularly that of buccal mucosa as snuff is kept between the mucosa of the cheek or lower lip and the jaw enabling prolonged contact times for carcinogens with mucosal tissues.[14]On eliminating its use, tobacco induced morphological changes in the oral mucosa and risk of cancer reverses rapidly; upto 30% for those who have quit smoking for 1-9 years and upto 50% for those who have quit for more than 9 years.[16]In countries of Asia, particularly India the habit of chewing a mixture of dried tobacco leaf, slaked lime, catechu, areca nut, condiments(pan), and

betel nut increases the risk of malignancy as much as 123 times.[17]It is usually kept in the gingivobuccal sulcus throughout night(night quid). Betel nut contains arecoline which stimulates collagen synthesis and proliferation of fibroblasts and tannin which stabilizes collagen fibrils. With regards to tobacco consumption women seem to have twice as much risk as men to develop oral cavity cancers.[18]

ALCOHOL:

Cancers of the oral cavity are six times more common in people who consume alcohol and 70-80% of people who develop the disease give a history of alcohol consumption.[19]Heavy alcohol consumption(more than 55 drinks per week) actually has a greater risk than tobacco alone.[20] Alcohol is an independent risk factor but acts synergistically with smoking.[21] Cancers of the floor of mouth, a dependent area of the oral cavity is more common in alcoholics an smokers due to pooling of saliva.[22]Alcohol acts as a promoter, irritant, a solvent for carcinogens and also interferes with DNA repair after exposure to nitrosamine compounds.

MARIJUANA

There is no concrete evidence yet that there is an association between marijuana usage and oral cancers.[26]It is difficult to analyse this given fact that tobacco, alcohol, marijuana are often consumed together.

ULTRAVIOLET RADIATION:

Prolonged exposure to sunlight causes hyperkeratosis, atrophy of fat and glandular elements and is a proven risk factor for carcinoma of the lip particularly in countries which receive abundant sunshine. Lack of pigments makes the lip more vulnerable to ultraviolet radiation and its deleterious effects.

HUMAN VIRUSES:

While it is unclear whether HSV by itself can induce cancer, it is thought to act as co-carcinogens with tobacco and alcohol sensitizing the oral mucosa to their effects.[23] Some studies have demonstrated the presence of HPV in up to 50% of oral cancers; HPV-6 and HPV-16 are most commonly associated with oral cavity cancers.[24] Further exposure to tobacco is necessary for inducing any malignant transformation.[25]

DIET AND NUTRITION:

Deficiencies of vitamins A, C, E and iron are associated with oral cavity malignancies. Alcoholism induced riboflavin deficiency may contribute to increased oral cancer rates in that population. Similarly iron deficiency induced atrophic changes in oral mucosa[27] could be the reason behind increased oral cancer rates seen in Plummer Vinson syndrome. Conversely a diet rich in dark yellow, cruciferous, green leafy vegetables and fruits reduces the risk by approximately 40-60%.[28]

DENTAL FACTORS:

People with dental caries, plaques, inflammation of the gingivae appear to have a greater risk when compared to the general population.[29] An ill fitting denture could increase the risk of cancer of the tongue.[30] Poor oral hygiene is often associated with tobacco and alcohol abuse. Oral microflora may act on ethanol and convert it to acetaldehyde a known carcinogen.[31]

MECHANISMS OF CARCINOGENESIS

Oral cavity cancers have an underlying multistep carcinogenesis akin to Carcinoma of colon, described by Fearon and Vogelstein[32]where in precancerous polyps progress to invasive carcinoma. Some notable molecular alterations are:

EGFR/TGF-α

Increased production of these tyrosine kinase receptors is an early event in head and neck cancers.[33] EGFR is upregulated in head and neck squamous cell carcinoma and this fact may be used therapeutically.[34]

TP53

Nearly 50% of head and neck cancers show mutation of TP53 gene.[34] Loss of this gene results in defective DNA repair, accumulation of genetic defects and consequently transformation of preinvasive to invasive lesions.[35]

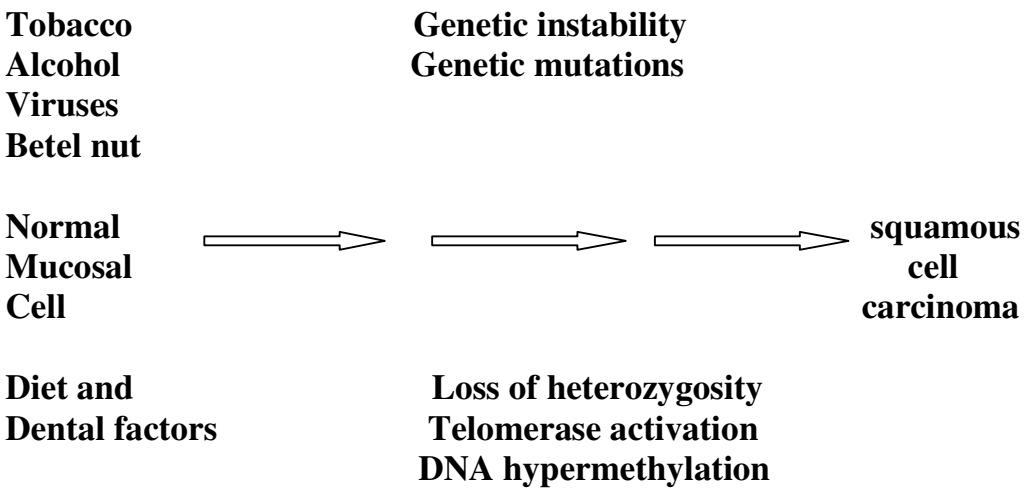
TP16 /CYCLIN D1

These are cell cycle regulatory genes. Inactivation of TP16 is seen in early head and neck cancers.[36] Amplification of cyclin d1 is seen in 33-68% of head and neck cancers.[37] These events cause up regulation of cell cycle and also correlate with a decreased survival and disease free rates in patients with cancer of the tongue.[38]

BAX/BCL2

Overexpression of the anti-apoptotic gene BCL-2 and reduced expression of pro apoptotic gene BAX[44] is seen in poorly differentiated cancers and in dysplastic epithelium adjacent to invasive lesions

Mechanisms



FIELD CANCERISATION

Separate primary tumours do not necessarily have to arise from different genetic mutational events but could have originated from a common clonal progenitor and then migrate to separate areas as described by Slaughter and colleagues.[8]

SECOND PRIMARY TUMOUR

Chronic exposure of the oral cavity to irritants results in the development of separate tumours in different anatomical sites. This can present synchronously (4%) within 6 months or metachronously (80%) delayed. Overall the risk of developing a second primary tumour is around 15%. 50% of metachronous tumours develop within two years.[8]

PATHOLOGY

PREMALIGNANT LESIONS:

This is a morphologically altered tissue in which there is an increased likelihood of developing cancer.

LEUKOPLAKIA

This dermis given to a white keratotic patch or plaque which cannot be rubbed off and cannot be given any another diagnostic name[39] (Fig.4). It arises because of chronic irritation of the local mucosa. Homogenous leukoplakia has low malignant potential but lesions with a speckled or verrucuous pattern, central erosion or ulcer, red patches or a peripheral nodule have a increased risk for malignancy; 4-18% of these lesions turn into invasive cancers.[40] Alcohol, tobacco, chronic irritation due to ill fitting dentures, syphilitic glossitis, canididiasis, deficiency of vitamin A and B are considered to be risk factors for leukoplakia.[41]

ERYHTROPLAKIA

This appears as a red plaque and has a seven fold greater chance of malignant transformation than leukoplakia.[42] They are most common over the tonsillar pillars and soft palate and do not arise from chronic irritation or inflammation. Mixed lesions in which leukoplakia and erythroplakia are seen together have a

five-fold increased risk than homogenous leukoplakia.[43]So it is wise to biopsy all erythroplakic lesions.

LICHEN PLANUS

This presents clinically with white lacy lines in the buccal mucosa against a violaceous background.

PRE MALIGNANT CONDITIONS

This includes states which are associated with a significantly increased risk for malignancy.

DYSPLASIA

This is a histological term which includes increased nuclear to cytoplasmic ratio, increased mitotic figures, pleomorphism, abnormal maturation of cells etc. Dysplasia can be mild-where changes are limited to the basal layers of the epithelium, moderate-involving two-thirds of the epithelium, severe-involving more than two thirds of the epithelium. Full thickness dysplasia is also known as carcinoma in situ. The risk of malignant transformation is 10-14%.[44]

CHRONIC HYPERPLASTIC CANDIDIASIS

This condition is due to candida albicans and produces dense plaques of white leukoplakia particularly around the commissures of the mouth. There is a high

incidence of malignant transformation especially in those who are immnunocompromised.[8]

ORAL SUB MUCOSAL FIBROSIS

Oral submucosal fibrosis is exclusive to Asians and is characterized by fibrous bands beneath the mucosa which limit mouth opening and tongue movement. (Fig.3) Histologically the epithelium is fibrosed, hyperplastic and may show dysplastic changes. This condition is associated with use of pan masala areca nut with or without concurrent alcohol use.[8]

SIDEROPENIC DYSPHAGIA

Sideropenia predisposes to cancer but causing epithelial atrophy which renders the mucosa more vulnerable to carcinogens. This is common in Scandinavian women.[8]

SYPHILITIC GLOSSITIS

By causing end arteritis syphilitic glossitis results in epithelial atrophy and more susceptibility to the effects of carcinogens.

DYSKERATOSIS CONGENITA

The syndrome complex of oral leukoplakia, nail dystrophy and reticular atrophy is called dyskeratosis congenita.

MALIGNANT LESIONS

CLASSIFICATION OF TUMOURS

1. Epithelial

Squamous cell carcinoma

Other variants of SCC

Verrucous

Spindle

Lymphoepithelioma

Undifferntiated

Basaloid squamous cell carcinoma

Adenocarcinoma

Other variants of adenocarcinoma

Malignant mixed carcinoma

Adenocystic carcinoma

Mucoepidermoid carcinoma

Acinic cell carcinoma

2. Non-epithelial

Melanoma

Lymphoma

Soft tissue sarcoma

Plasmacytoma

SQUAMOUS CELL CARCINOMA

More than 90% of all oral cavity cancers are squamous cell carcinomas. Morphologically it can be:

ULCERATIVE

Ulcerative type is the most common and presents as oval or round ulcers with heaped up edges that bleeds easily and has the tendency to infiltrate deeply.

EXOPHYTIC

Exophytic tumours are less common have a superficial spreading pattern and also a better prognosis as.[45] It is also the most common type arising from the lip.

INFILTRATIVE

Infiltrative tumours are aggressive, may exhibit perineural invasion, are common in the tongue and may invade the mandible.

BRODER'S GRADE[46]

Histologic grading of squamous cell carcinoma into four grades is based on nuclear pleomorphism, extent of keratinisation, frequency of mitoses etc. The usefulness of Broder's grading in predicting prognosis is unclear.[47]

It is classified as

a) Well differentiated (Grade – I >75% of keratin pearls)

b) Moderately differentiated (Grade II 50-75% keratin pearls)

c) Poorly differentiated (Grade III 25-50%of keratin pearls)

d) Undifferentiated (Grade IV<25% of keratin pearls)

VERRUCOUS CARCINOMA

Verrucous carcinoma accounts for 5%[48]of oral malignancies. It is a variant of squamous cell carcinoma and clinically presents as an exophytic sharply circumscribed tumour with pushing borders that projects above the mucosal or cutaneous surface. They most commonly occur over the gingival and buccal mucosae and are more common in women [>78%] and the elderly. The histological appearance is that of a hyperplastic epithelium with intact basement membrane and no mitotic activity that classifies them as well- differentiated carcinoma. They generally have an indolent biologic course rarely ever metastasizing. The hybrid variety of verrucous carcinoma which has multiple

foci of squamous cell carcinoma is known to behave more aggressively with the ability to metastasize[49]and if treated with radiation, more likely to dedifferentiate into anaplastic carcinoma.[49]

BASALOID SQUAMOUS CELL CARCINOMA

This is yet another aggressive variant of squamous cell carcinoma which clinically presents as an ulcerative lesion. Microscopically it is characterised by basaloid cells that are arranged in the form of nest or cords interspersed with pseudoglandular spaces, a propensity to invade perineural spaces, high mitotic rate and a duplicated basal lamina.[51] Among squamous cell carcinoma this has the highest recurrence rate. They also tend to metastasize more frequently and therefore a worse prognosis.[52]

NON EPIDERMOID MALIGNANCIES

They account for less than 10% of oral cavity malignancies and predominantly arise from the minor salivary glands. Other malignancies included in this group are melanoma, lymphoma, Kaposi's sarcoma etc.

ADENOID CYSTIC CARCINOMA

It is the most common (30-40%) malignancy arising from the minor salivary glands.[53](Fig.5) They most commonly occur over the hard palate and are clinically characterized by local infiltration, perineural invasion in 5-73%[54] and a slow growth rate. Distant metastases (50%) to lung, brain and bone are much more common than regional metastases(14%).[55] Upto 15% of adenoid cystic carcinoma recur more than five years after diagnosis; recurrence is possible even after 15-20 years and therefore long term follow up is essential.[56] High survival and low recurrence rates characterize adenoid cystic carcinoma of the oral cavity.[57]

KAPOSI'S SARCOMA

This is the most common malignancy associated with AIDS. Nearly 50% of AIDS associated Kaposi's sarcoma has oral cavity involvement. These tumours are composed of endothelial cells with extravasated erythrocytes. Kaposi's sarcoma most commonly involves the perioral skin, gingivae, hard palate and tongue. HHV-8 induced malignant degeneration is thought to be the reason for AIDS associated Kaposi's sarcoma.

MELANOMA

Oral cavity melanomas are extremely rare[58]and are commonly found in the palate, gingivae, buccal mucosa and lip.[59] Benign melanosis precedes melanoma

in around one-third of the cases.[60]Melanomas show positivity for S-100,HMB-45.[58]95% melanoma of oral cavity are pigmented. Oral cavity melanomas have a poorer prognosis compared to cutaneous melanomas as they are frequently diagnosed late and also because the oral cavity has rich lymphatics and blood supply enabling easy dissemination of the tumour. Long term follow up is absolutely essential because melanomas can recur as late as ten years after treatment. One should remember the possibility of metastatic melanomas which are frequently diagnosed late.

LYMPHOMA

Primary lymphomas of the oral cavity mostly arise from the waldeyer's ring. While nearly 80% of patients with NHL have nodal involvement, 10% have extra nodal disease.[62] Of these 2% can have oral cavity involvement[63] involving the palate and the gingival most commonly.

CLINICAL PRESENTATION

The most common symptoms are a non healing ulcer or a mass lesion in the mouth. Pain may or may not be associated. Other symptoms include. Pain-due to infection, ulceration or involvement of nerves, referred pain in ear is due to involvement of 9 and 10 cranial nerves and in cancers of tongue, due involvement of lingual nerves where it is referred along the auriculotemporal nerve. Persistent or bleeding ulcer. Loose teeth and ill fitting dentures-in cancers involving the alveolar ridge. Pain in the mandible. Trismus- when there is pterygoid muscles primarily seen in retro molar trigone cancers. Trismus is also considered to be a symptom of advanced disease. Numbness-indicates perineural invasion. Dysphagia- either due to posterior extension of the tumour or due to involvement of the geniohyoid muscle. Drooling of saliva- because of irritation of nerve fibres of taste and also due to difficulty in swallowing. Ankyloglossia (inability to protrude tongue)–due to involvement of tongue musculature. Odynophagia, Voice change- difficulty in articulation and restriction of tongue mobility is responsible for this symptom. Halitosis (foul smelling breath) due to infection and necrosis of the oral cavity. Facial nerve palsy-in advanced cases of buccal carcinoma. Cervical adenopathy-in advanced oral cavity cancers. Respiratory distress (rarely)-in terminally ill patients, systemic symptoms like malnutrition, dehydration, weight loss etc.

CANCER OF THE BUCCAL MUCOSA

This is the most frequently involved site in Indians. The usual presentation is that of a lumpy sensation in the tongue; pain is rare but for the involvement of lingual and dental nerves. Early lesions are exophytic and can even penetrate the skin as they grow. Trismus, enlargement of the parotid gland due to duct obstruction etc can occur depending on the direction of extension of the tumour.

CANCERS OF THE ORAL TONGUE

The tongue is most commonly involved in the western population and second most commonly involved in Indians. These most commonly present with a mild irritation of the tongue and in later stages pain which radiates to the external auditory meatus. Speech and deglutition are affected when there is extensive infiltration of the tongue musculature. The ventral and the lateral aspects at the junction of the middle and posterior thirds of the tongue are most commonly affected.[50] Lesions of the middle third may invade the floor of the mouth whereas lesions of the posterior third may grow behind the mylohyoid and present as a mass at the neck of the mandible. Rarely the hypoglossal nerve may be involved.

CANCER OF THE FLOOR OF MOUTH

Early lesions appear as red ill defined areas with little induration; ulceration and rolled out edges become evident as the lesion enlarges. More than 90% of

lesions are found within 2 cm of the midline of the floor of mouth. While invasion to geniohyoid, genioglossus and the buccal mucosa is common the mylohoid acts as a strong barrier and is breached only when the lesion is advanced. Likewise late lesions may invade the mandible. The submandibular gland may be enlarged either due to tumour invasion or infection secondary to duct obstruction.

CANCER OF THE LIP

This may present as a discrete lesion most commonly in the vermilion border of the lip that is usually not tender until it ulcerates. In the United State, it is the second most commonly involve site.[61]The lower lip is more commonly affected (90%), commissure (<1%) and the upper lip (2-7%).[64] Dermal lymphatic invasion is evident by erythema of skin and paraesthesia denotes perineural invasion. Advanced lesions invade the commissures, buccal mucosa, skin, wet mucosa of lip, adjacent mandible and finally the mental nerve.

CARCINOMA OF THE GINGIVAE, HARD PALATE AND RETRO MOLAR TRIGONE

These patients present with ill fitting dentures, loose teeth, non healing sores and paresthesia of the lower lip due to involvement of the inferior dental nerve. Cancers of the retromolar trigone present with pain referred to the external auditory meatus and trismus.

PATTERNS OF SPREAD

DIRECT SPREAD

Spread of oral cavity cancers is mainly determined by the local anatomy and therefore unique to each site. While muscle invasion is common, bone and cartilage acts as natural barriers to spread and tumours that come into contact with these structures are usually diverted along paths of least resistance. Tumours may extend into the parapharyngeal space and from there go either to the skull base or the neck. Luminal spread along ducts is also uncommon. Perineural invasion if present augur a poorer prognosis and also these tumours may track along a nerve to the skull base and then the central nervous system. Risk of distant metastases is increased if there is vascular invasion.

LYMPHATIC SPREAD

Risk of lymphatic spread is determined by size of the primary lesion, grade of the tumour, vascular space invasion, and density of capillary lymphatics. Squamous cell carcinoma is more likely to metastasize than sarcomas and minor salivary gland tumours. Lesions that are well lateralized spread to the ipsilateral nodes[66] while lesions that are close to the midline, tongue base and may spread bilaterally. Contralateral nodal involvement may occur in well lateralized lesions if lymphatic pathways are blocked by surgery or radiotherapy. Most commonly, the level II nodes are involved. Usually anastomotic channels that cross the submental space provide a path for this spread. Around 16% of patients with squamous cell carcinoma had solitary metastases in level III and

IV without involvement of levels I and II. So called skip metastases[68].The most important prognostic factor in squamous cell carcinoma is the presence of cervical nodes. Patients with a large, fixed node, involvement of multiple levels or extracapsular spread have an even poorer prognosis.[69]

DISTANT METASTASES

The most commonly involved distant sites are the lung (66%), bone (22%) and liver (9.5%).[70]Possibilities of distant metastases is dependent on N stage than T stage. Distant metastases are more likely if more than two nodes are involved and if there is extracapsular spread.

TNM STAGING FOR ORAL CAVITY CARCINOMA[5]

PRIMARY TUMOUR[9]

- T_X Unable to assess primary tumour
- T_0 No evidence of primary tumour
- T_{is} Carcinoma in situ
- T_1 Tumour is < 2 cm in greatest dimension
- T_2 Tumour > 2 cm and < 4 cm in greatest dimension
- T_3 Tumour > 4 cm in greatest dimension
- T_4 (lip) Primary tumour invading cortical bone, inferior alveolar nerve, floor of mouth, or skin of face (e.g., nose or chin)
- T_{4a} (oral) Tumour invades adjacent structures (e.g., cortical bone, into deep tongue musculature, maxillary sinus) or skin of face

- T_{4b} (oral) Tumour invades masticator space, pterygoid plates, or skull base and/or encases the internal carotid artery

NODE

- N_X Cannot assess regional lymph nodes
- N_0 No evidence of regional lymph node metastasis
- N_1 Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
- N_{2a} Metastasis in a single ipsilateral lymph node, none > 3cm and < 6 cm in greatest dimension
- N_{2b} Metastasis in multiple ipsilateral lymph nodes, none< 6 cm in greatest dimension
- N_{2c} Metastasis in bilateral or contralateral lymph nodes, all nodes < 6 cm in greatest dimension
- N_3 Metastasis in a lymph node > 6 cm in greatest dimension

DISTANT METASTASES

- M_X Cannot assess for distant metastases
- M_0 No distant metastases
- M_1 Distant metastases

STAGE GROUPING:

STAGE	TUMOUR	NODE	METASTASIS
STAGE 0	Tis	N0	M0
STAGE 1	T1	N0	M0
STAGE 2	T2	N0	M0
STAGE 3	T3	N0	M0
	T1-T3	N1	M0
STAGE 4A	T4a	N0-N1	M0
	T1-T4a	N2	M0
STAGE 4B	T4b	Any N	M0
	Any T	N3	M0
STAGE 4C	Any T	Any N	M1

ADVANTAGES CLINICAL STAGING:

1) Designing treatment strategies2) Compare results3) Assess prognosis[65]

DISADVANTAGES OF CLINICAL STAGING:

While predicting prognosis it does not take into account certain important host factors which influence the outcome e.g. patient's performance status, comorbidities, nutritional status, immune status.[67]Pathological features which influence prognosis like extracapsular speard, perineural invasion etc are not included in the staging criteria. Other prognostic features like fixity of nodes, level of nodal disease etc are also not included. It relies heavily on clinical examination of the neck which is not infallible. The incidence of false negative physical examination (with occult metastases) varies from 16-60%.[7]

INVESTIGATIONS IN ORAL CAVITY MALIGNANCIES

Evaluation of a patient with oral cavity malignancy should include

1) History, 2) Physical examination, 3) Dental assessment, 4) Radiography, 5) Tissue biopsy, 6) Intraoperative visualization under general anaesthesia if needed.

BIOPSY

An incisional biopsy is taken from the ulcer under local anaesthesia. Specimen should include suspicious areas and normal mucosa avoiding necrotic areas.

FINE NEEDLE ASPIRATION CYTOLOGY

This is done for clinically palpable nodes. Ultrasonogram guided fine needle aspiration cytology is helpful in managing patients with non palpable neck nodes.

CHEST X RAY

Chest X ray gives useful information about metastases to the lung and second primary cancers if any.

ORTHOPANTOMOGRAM

PANOREX-dental panoramic radiograph is useful for ruling out mandibular invasion but gives only limited information about the symphysis and lingual cortex.

COMPUTED TOMOGRAM

This is done for patients with trismus, lesions abutting the mandible, if marginal mandibulectomy is planned, in evaluating a N0 neck, to rule out carotid involvement, assessing the pterygoid region.

MAGNETIC RESONANCE IMAGING

Magnetic resonance imaging is superior to computed tomogram in picking up invasion of the base of the tongue, perineural invasion and is useful in people with dental amalgams which are visible in a computed tomogram scan as artefacts. Post-contrast magnetic resonance imaging is highly sensitive in detecting perineural invasion.[72]

ULTRASONOGRAM

Ultrasonogram can be used to screen non palpable lymphadenopathy with the added benefit of not exposing the patient to radiation. It can be combined with fine needle aspiration cytology and this has a specificity of around 90%.[73]

PET SCAN

The precise role of a PET scan in oral malignancies is yet to be defined. At present it is used to detect nodal metastases and recurrent disease.[74]

INDIRECT OR FIBREOPTIC LARYNGOSCOPY

Is done to visualize posterior oral cavity.

DIRECT LARYNGOSCOPY OR OESOPHAGOSCOPY

Is required to know about the full extent of the disease, as well as to detect a second primary cancer, if any.

Maximum accuracy in diagnosing cervical metastases was with Ultrasonogram guided fine needle aspiration cytology (93%),followed by Magnetic resonance imaging (82%), Computed tomogram(78%), Ultrasonogram(75%), Palpation(69%).

TREATMENT OF ORAL CANCERS

Choosing an initial treatment modality for oral cancers is one after taking into account:

TUMOUR FACTORS: like size, site, location (anterior vs. posterior), proximity to bone (mandible or maxilla), cervical lymph node status, previous status, previous treatment, histology (type, grade and depth of invasion).

PATIENT FACTORS: like age, general condition of the patient, tolerance, occupation, acceptance and compliance, life-style (smoking/drinking) and socio-economic considerations.

PHYSICIAN FACTORS: like chemotherapy, radiotherapy, prosthetics, dental factors, rehabilitation services, support services.

Ultimately **THE GOAL:** is to 1) cure cancer 2) preserve form and restore function 3) minimize adverse effects and delayed effects of treatment 4) prevent second primary tumours.

TREATMENT OPTIONS: available for oral cavity cancers include surgery, radiotherapy, chemotherapy and a combination therapy.

PRINCIPLES OF SURGERY

The mainstay of treatment of oral cancers is surgical excision. An adequate margin of 1-1.5 cm should be given to ensure proper resection. The resultant surgical defect is closed primarily or allowed to heal by secondary intention. Large defects are closed by split thickness skin graft, local rotational or advancement flap or a free flap.[75]

Surgery and radiotherapy are equally effective in treating T1&T2 lesions. Therefore early lesions are preferentially treated by a single modality. Advanced lesions require combined modality treatment where radiotherapy is clubbed with surgery either preoperatively or postoperatively. The tumour factors determine the choice of surgical approach for a primary tumour.[75]

ADVANTAGES OF SURGERY[76]

- Lesser treatment time and also faster rehabilitation
- Saves other modalities of treatment for second primary cancers
- Provides a specimen that can be subjected to pathological examination for assessing adequacy of resection and also for deriving prognostic information.
- Beneficial in patients with radiation induced complications

DISADVANTAGES OF SURGERY[77]

- Risks associated with administering anaesthesia
- Expensive
- Functional disability post surgery

TYPES OF SURGERY FOR PRIMARY CANCERS

- Wide local excision
- Composite oral resection
- Composite oral resection with hemimandibulectomy
- Maxillectomy
- Hemiglossectomy

MANDIBLE

Mandible is involved due to[77]

- Encroachment or abutting of bone
- Direct invasion of bone
- Prevention of surgical access

BONY INVOLVEMENT

- Even in the absence of radiographic findings, there is a high incidence of microscopic invasion of periosteum or the cortex by tumours that encroach the mandible.

- Around 30% of tumours that encroach on the mandible have microscopic invasion and a normal looking mandible in conventional x rays and orthopantomograms.
- Technetium-99 scans are more sensitive than radiographs but cannot differentiate between inflammation, infection and tumour.
- A highly precise multiplanar reformatting CT(dentascan) provides accurate spatial information about destruction of cortex, inferior alveolar nerve and other structures.[78]
- Direct invasion of the mandible apparent clinically or radiographically requires segmental mandibulectomy.

TYPES OF MANDIBULAR RESECTION

MARGINAL MANDIBULECTOMY

This involves resection of inner or outer rim of the mandible preserving continuity of the mandible. It is done 1) for obtaining a satisfactory three dimensional margin around the primary tumour, 2) when the primary tumour approximates the mandible but is mobile, 3) if there is minimal cortical erosion of the mandible. Marginal mandibulectomy is contraindicated 1) if there is invasion into cancellous part of the mandible, 2) extensive soft tissue disease, 3) pipe stem mandible, 4) previously irradiated edentulous mandible.

SEGMENTAL MANDIBULECTOMY

This involves removal of bone from the angle to the mental foramen. Indications are 1) cancellous bone involvement, invasion of lingual or lateral cortex of the mandible.

PARTIAL MANIBULECTOMY

This involves removing a part of mandible from the mental foramen to the coronoid process line removing the coronoid process but sparing the condyle of the mandible.

HEMIMANDIBULECTOMY

Here bone from the symphysis to the condyle on one side is removed.

MANDIBULAR RECONSTRUCTION[8]

Functional impairment of speech and deglutition following segmental resection varies with the location of the bony defect. Even a small anterior resection causes significant impairment compared to lateral defects and necessitates the use of reconstructive techniques.

METHOD OF RECONSTRUCTION

METHOD	TECHNIQUE
No reconstruction	Primary closure
Soft tissue only	Pectoralis major myocutaneous flap
Alloplastic material	2-4 mm reconstruction plate alone
Combination alloplastic/soft Tissue	2-4 mm reconstruction plate, PMMCF
Non-vascularized bone grafts	Titanium tray and cancellous chips
Vascularised bone graft	Fibula (edentulous and dentate) Iliac crest(dentate) scapula concomitant soft tissue defect

SURGICAL ACCESS

Different approaches to improve access are[77]

1) MANDIBULAR SWING APPROACH / MANDIBULAR OSTEOTOMY

This requires a midline lip splitting incision to expose the symphysis. Mandibular osteotomy can then be done either in the midline or a paramedian position and mylohyoid muscle is then divided enabling the mandible to swing. The disadvantages are lip scarring, mandibular malunion, loss of teeth and paresthesia.

2) VISOR-FLAP APPROACH

The mandible is kept intact and skin, soft tissues are dissected off it and lifted superiorly granting access to the anterior and lateral oral cavity. This approach may compromise the blood supply to the mandible and cause damage to the mental nerves.

3) TRANSORAL / INTRAORAL APPROACH:

Useful for small cancers in the oral cavity.

4) CHEEK-FLAP APPROACH (PATTERSON OPERATION)

5) LIP SPLIT INCISION

RECONSTRUCTIVE SURGERY[9]

Primary reconstruction of surgical defects with well vascularised flaps allows for prompt healing, an early return to normal function, and a shorter hospital stay.

As a rule reconstruction of the post excisional defect is to be done in the same sitting, save for those cases where there is ambiguity about the adequacy of resection and general condition of patient is poor extensive surgery is ruled out.

POST-EXCISIONAL DEFECTS MAY BE COVERED BY[75]

- Primary closure
- Split skin graft
- Local graft
- Skin and other tissues brought from a distant site

- Free flap micro vascular anastomosis

SPLIT SKIN GRAFT

This is excellent procedure in those places where the bed is suitable. These grafts cannot fill a cavity or cover an exposed bone and are contraindicated in an irradiated bed. Graft contraction is another undesirable quality of these grafts. The whitish appearance of these grafts is due to desquamation.

FULL THICKNESS GRAFT

These grafts do not contract and therefore achieve better cosmesis.

The donor site should be hairless for obvious reasons.

MUCOUS MEMBRANE GRAFT

These are the ideal free grafts but availability is limited.

LOCAL FLAPS

These are readily available and versatile flaps. Some examples are

- Forehead flap
- M. Narayanan bipolar flaps
- Sternomastoid myocutaneous flap
- Trapezius flap
- Platysma myocutaneous flap
- Tongue flaps
- Temporalis flap
- Naso labial flap

- Estlander rotating flap
- Fries' modified Bernard facial flap
- Gillies fan flap
- W flap plasty
- Abbe flap
- Karapandzic flap
- Johansen step ladder flap

REGIONAL ARTERIALIZED FLAPS

These flaps have a good blood supply and obviate the need for microvascular anastomosis. Some examples are

- Deltopectoral flap
- Latissmus myocutaneous flap
- Pectoralis major myocutaneous flap
- Rectus abdominis flap

FREE FLAPS

These flaps are composite sections of tissue with microvascular anastomosis and provide excellent cosmesis and functional benefit.

- Free osteocutaneous groin flap
- Radial forearm flap (Chinese flap)
- Osteocutaneous fibular graft

PRIMARY RECONSTRUCTIVE OPTIONS[8]

ANATOMICAL SITE	MICROVASCULAR FREE FLAP	ALTERNATE FLAP
Floor of Mouth	Forearm	B/L nasolabial folds
Lateral tongue	Forearm	Platysma skin flap
Total Glossectomy	Rectus abdominis	Pectoralis major
Buccal mucosa	Forearm	Temporalis muscle
Low Hard palate	Temporalis muscle	Forearm
High	Iliac crest	Fibula

MICROVASCULAR FREE FLAPS[8]

FLAP	BLOOD SUPPLY	VARIANTS
Forearm	Radial artery	skin only; fascia only
Composite forearm	Radial artery	skin and bone(radius)
Anterolateral thigh	Perforators of Profunda femoris	skin only; skin& muscle
Rectus abdominis	Deep inferior epigastric artery	skin and muscle; muscle only
Fibula	Peroneal artery	Bone and skin; bone; fascia
Ilium	Deep circumflex iliac artery	Bone; bone&muscle, bone, muscle&skin.
Scapula	Subscapular artery	Bone and skin; bone and muscle.

NECK DISSECTION

Metastases to the neck decrease survival by around 50%. Neck metastases are effectively treated by a single modality if a single node is involved and there is no extracapsular spread. More advanced disease requires a combined approach.[75]

CLASSIFICATION OF NECK DISSECTION:

RADICAL NECK DISSECTION

Radical neck dissection was first described by Crile in 1906.[79] It is a bloc removal of fat, fascia, lymph nodes, level I-V nodes along with sternocleidomastoid and omohyoid, internal jugular vein, spinal accessory nerve,cervical plexus, submandibular salivary gland and tail of parotid, prevertebral fascia. This is appropriate for N2, N3 lesions. This is an operation with high morbidity. Patients experience chronic shoulder pain, numbness, restriction of movement, fibrosis and cosmetic deformity.

MODIFIED RADICAL NECK DISSECTION

This was described by Bocca. Modified radical neck dissection spares some or all of the non-lymphatic structures in the neck and causes less morbidity when compared to Radical neck dissection.[75]Suited for N0 neck, nodes of size 1-3 cm and mobile, for removal of residual N2, N3 disease postradiotherapy.[76]There are three types:

Type-1 preserves the spinal accessory nerve

Type-2 preserves the internal jugular vein in addition to the spinal accessory

Type-3 preserves the sternocledomastoid in addition to the above structures.

SELECTIVE NECK DISSECTION[77]

This dissection preserves certain lymph node groups.

Supraomohyoid neck dissection – only level I - III nodes are removed.

Extended supraomohyoid neck dissection- levels I – IV are removed

Posterolateral neck dissection – removal of II - V groups

Lateral neck dissection- removal of II - IV nodes

Anterior compartment dissection- removal of level VI nodes only

EXTENDED RADICAL NECK DISSECTION

In addition to structures removed in Radical neck dissection, this surgery removes parapharyngeal and superior mediastinal nodes and non lymphatic structures like the carotid artery, hypoglossal nerve, vagus nerve and paraspinal muscles.

INCISIONS USED FOR NECK DISSECTION

Mac fee incision, Crile incision, Martin incision, Schechter incision.

COMPLICATIONS OF NECK DISSECTION[8]

Bleeding, pneumothorax, raised intracranial pressure, wound breakdown, infection, necrosis of skin flap, seroma, carotid rupture, chylous fistula, frozen shoulder.

MANAGEMENT OF NECK[8]

CLINICALLY NODE NEGATIVE NECK

ELECTIVE NECK DISSECTION

Incidence of occult metastases to neck nodes is 30%, particularly in patients with cancer of the tongue and floor of mouth and these cancers managed by supraomohyoid neck dissection. It is advisable to do extended supraomohyoid neck dissection for carcinoma tongue to cover skip metastases.

ELECTIVE NECK IRRADIATON

When the primary tumour is treated with surgery irradiation is given to the neck.

CLINICALLY NODE POSITIVE NECK

N1 DISEASE:

Managed by selective supraomohyoid neck dissection.

N2A AND N2B DISEASE:

Managed by radical or modified radical neck dissection followed by post-operative radiotherapy. Palliative radiotherapy is given to unfit patients.

N2C DISEASE

Requires bilateral neck dissection and preservation of internal jugular vein on the minimally involved side followed by postoperative radiotherapy.

N3 DISEASE

If the disease is resectable radical neck dissection is done followed by radiotherapy and if it is not, radiotherapy is given first to make it resectable and radical neck dissection is done.

COMPLICATIONS OFSURGERY

- Oral incompetence
- Facial disfigurement
- Flap necrosis
- Orocutaneous fistula
- Loss of dentition
- Salivary gland obstruction secondary to duct disruption
- Nerve injuries and associated morbidities- facial, hypoglossal and lingual nerves
- Dysphagia
- Microstomia

PRINCIPLES OF RADIOTHERAPY

Radiotherapy is suited for Squamous cell carcinoma which are vascularised and well oxygenated and hence, more radiosensitive. Advanced lesions which invade bone or the muscle are relatively more radioresistant.[77]

For early lesions surgery and radiotherapy both are equally effective. For advanced lesions radiotherapy is and useful adjunct preoperatively and postoperatively in controlling locoregional disease.[75]The usual dose given varies from 65-75 Gy. Radiotherapy failures are managed by surgery.

ADVANTAGES OF RADIATION OVER SURGERY[76]

- Retains tissues thereby preserving function and appearance
- Avoids post operative complications
- Morbidity is minimal when compared to surgery
- Permits surgery to be used as a salvage procedure.

MODE OF RADIATION[77]

- EBRT- external beam radiation.
- Hyperfractionation entail giving smaller twice daily doses and this has been shown to increase loco regional control[54]
- Three dimensional conformal radiotherapy minimises exposure to normal tissues.

- IMRT – intensity modulated radiation. Uses computer technology and sleeves to block normal tissue and permits maximum dose to be given to the tumour and minimizes exposure to important structures.
- Interstitial radiotherapy-brachytherapy. This technique is given in conjunction with EBRT, it enables a large dose to be given to the target tissue while minimising the dose given through EBRT thereby eliminating unwanted effects like trismus, xerostomia. But it requires administration of general anaesthesia to place catheters and elective tracheostomy should be performed to safeguard against potential airway compromise.
- Intraoral orthovoltage or electron cone radiotherapy minimises exposure to the mandible in particular.

PREOPERATIVE RADIOTHERAPY

INDICATIONS[76]

- Fixed nodes
- When gastric pull up is used for reconstruction
- Open biopsy of a positive neck node
- If post operative RT will be delayed > 8 weeks

ADVANTAGES OF PREOPERATIVE RADIOTHERAPY[77]

- Converts an inoperable lesion to an operable one
- Extent of surgery
- Decreases the number of distant metastasis

DISADVANTAGES OF PREOPERATIVE RADIOTHERAPY[77]

- Wound healing problems
- Difficulty in assessing tumour margin during surgery

POSTOPERATIVE RADIOTHERAPY

INDICATIONS[75]

- Margins < 5 mm
- Extracapsular extension
- Multiple positive nodes
- Soft tissue invasion
- Endothelial lined space invasion
- Perineural invasion
- Locally aggressive poorly differentiated tumour
- Tumour spillage during resection
- Advanced stage

ADVANTAGE OF POSTOPERATIVE RADIOTHERAPY[76]

- Margins are better delineated
- A higher dose of RT can be safely used
- Healing is better
- Decreases operative morbidity

DISADVANTAGES OF POSTOPERATIVE RADIOTHERAPY[76]

- Distant metastases are more likely to be higher
- Vascularity is likely to be reduced post surgery
- Delay in starting RT could cause progression of the disease
- A larger dose in necessary to cover surgical dissection

RADIOTHERAPY IS ALSO INDICATED FOR[77]

- T1 and T2 tumours radiotherapy is as useful as surgery
- Relapsing tumours
- As palliation
- Electively for neck nodes

COMPLICATIONS OF RADIOTHERAPY[8]

- Xerostomia
- Mucositis
- Dysguesia
- Osteoradionecrosis

- Trismus
- Dysphagia
- Thyroid dysfunction
- Atherosclerosis of carotid
- Visual impairment
- Radiation neuritis

PRINCIPLES OF CHEMOTHERAPY

- Insufficient if used as a single modality as it is not curative.
- Used in combined modality treatment, especially in patients with advanced disease (stage III and IV). Chemotherapy also enhances the effects of radiotherapy.

INDICATIONS FOR CHEMOTHERAPY

- To prevent the development of second primary tumours
- As palliation in patients with incurable, recurrent and metastatic disease
- To improve the chances of cure
- For organ preservation[80]

ADVANTAGES OF CHEMOTHERAPY

- Statistical improvement in disease free survival rate[81]
- Concurrent chemoradiation results in improved locoregional control and a decrease in the number of distant metastases.
- Chemotherapy may also act as a radiosensitizer.

DISADVANTAGES OF CHEMOTHERAPY

- There is no increase in the overall survival rate.[82]
- Toxic side effects of chemotherapeutic drugs like mucositis, neutropenia etc which is seen in around 12-50% of patients.[83]

INDUCTION CHEMOTHERAPY:

Chemotherapy is given prior to surgery, radiation or chemoradiation in an effort to improve locoregional control and decrease the possibility of distant metastases.[84]

Induction therapy with a triplet of cisplatin, 5-FU and taxane produced a better response. Presently the role of induction therapy is unclear.[76]

CONCURRENT CHEMOTHERAPY:

Here chemotherapy is given simultaneously with radiation. There are three main approaches for concurrent chemotherapy.[85]

1) Single agent or combination chemotherapy with a continuous course of radiotherapy 2) combination chemotherapy with a split-course radiotherapy

3) Chemotherapy alternating with radiotherapy

A variety of drugs and combinations have been used but according to NCCN guidelines concurrent cisplatin with radiotherapy should be the preferred choice.[86]

ADJUVANT CHEMOTHERAPY:

Here chemotherapy is given after surgery. Overall survival may not be improved but the incidence of distant metastases appears to be decreased.

Chemotherapy may be given as a single agent or as and combination which is arguably more effective than a single agent.

DRUGS USED AND THEIR DOSAGE

Methotrexate

Standard dosing is 40 mg/m^2 IV weekly. Based on toxicity dose should be decreased or can be increased upto 60 mg/m2

Cisplatin

Standard dosing is 75-100mg/m^2 IV every 3 – 4 weeks

Carboplatin

More commonly used as its adverse effects are less compared to cisplatin.

Taxanes

Paclitaxel should be given along with growth factor support at a dose of 250 mg/m^2 IV over 24 hours.

Docetaxel is given at a rate of 60-100 mg/m^2 over an hour. It has fewer side effects when compared to paclitaxel.

5- Fluorouracil

Standard dose is 1000mg/m^2 IV over 3 – 5 days and repeated in 28 day cycles.

Cituximab

This is a chimeric immunoglobulin G antibody that binds to EGFR which is highly expressed in head and neck cancers.[87]

RECOMMENDATION

The best way of cure is by prevention. Screening of high risk group should be done.

It was evident that most of our patients and by extrapolation the general public have a very poor understanding of dental hygiene and oral pathologies. Patients fail to recognize the early signs of oral malignancy and even if they do, choose to stay away from health care due to fear that there might be something wrong and consequently present late. The adverse effects of treatment put off patients from pursuing treatment.

Hence it is apparent that the need of the hour is to go into the villages and educate people about the early symptoms and signs of malignancy, the importance and the need of regular oral check up, the ill effects of habits that predispose to the development of oral premalignancy and malignancy and the need to avoid them. Our college conducts awareness programs on oral cancers in the local villages, which will help towards furthering that goal.Health education through mass media and posters in Health centers should be undertaken. Education of youth by mass media with a ban on advertisement of Tobacco, Alcohol is the need of the hour.

Dental surgeons and general practitioners should assume a bigger role and detect oral lesions when they are still operable and promptly refer patients to higher centers for proper management.All health professionals should be

educated about ways to detect oral carcinomas in their early stages and refer them to appropriate centres.

Regional and district hospitals should have the capability to carry out histological diagnosis.

MATERIALS AND METHODS

This study includes all patients who reported to the departments of surgery, medical oncology, radiation oncology and surgical oncology at Govt. Rajaji Hospital who were diagnosed with oral cancer. The study was for a period of Twenty four months from Jan 2011 to Dec 2012. There was no specific selection criteria used to select cases; patients came to the departments either directly or were referred from other departments and other hospitals after malignancy was proven by histopathological examination. Diagnosis was confirmed by histopathological examination of specimen which was obtained by wedge biopsy of the ulcer/growth. Detailed history regarding number, duration of symptoms, habits like smoking, tobacco / pan chewing were obtained, baseline investigations like a complete hemogram, blood biochemistry, X-ray chest and X-ray mandible were done as required.

It was followed by a through physical examination to accurately assess the size, extent and infiltration of tumour and neck nodes. All patients were given TNM staging. Patients with advanced disease were given chemoradiotherapy except in rare instances where surgery was done following chemoradiotherapy for residual disease. Those patients with inoperable disease were treated with palliative radiotherapy. Radiotherapy was given as external beam radio therapy using radioactive cobalt- 60, as the definitive treatment for advanced stages (stage 3 and 4) at a dose of 66 Gy (2.0 Gy/day for 5 days/week for a total of 6

weeks in 28-35 sittings) for primary and 50 Gy (2.0 Gy/day for 5 days/week for a total of 6 weeks) for neck combined with cisplatin at a dose of 100 mg/ m^2, 5-FU at 1000 mg/m^2 as infusion on 1,22nd and 43rd days as a chemoradiotherapy. Patients with early & operable disease was treated with surgery depends on site. Primary reconstructions of the post excisional defect was done for all patients which included Primary suturing, Split skin graft, Pectoralis major myocutaneous flap, Pectoralis major osseomyocutoneus flap and Fore head flap. Pectoralis major myocutaneous flap was used in majority of cases for both inner lining and cover.

RESPONSE CRITERIA

An excellent response meant a complete regression of tumour and nodes while persistence of residual lesion after chemoradiotherapy was considered partial response and residual lesion was treated with surgery.

FOLLOW UP

Patients whose lesions completely regressed were followed up with observation. Patients with residual lesion underwent salvage surgery to resect residual tumour along with a RND. All patients were followed up two weeks after surgery and follow up was done monthly for the 1st year and once in 3 months for the 2nd year during. Recurrences were managed with chemoradiotherapy.

LIMITATIONS OF THE STUDY

1. The study was plagued with a very high dropout rate even at the initial stages of the study, as some patients were not willing for surgical procedure.

2. Data regarding tumour free interval, survival period, recurrence rate etc were not available. This can be attributed to the short follow up period.

3. Since most of the patients presented with advanced disease, proper evaluation of primary radiotherapy in early stage of disease could not be studied.

OBSERVATION AND ANALYSIS

This study is based on 162 patients admitted in the departments of surgery, surgical, radiation and medical oncology of GRH, Madurai for a period of two years from Jan 2011 to Dec 2012.

TABLE-1

DISTRIBUTION OF PATIENTS ACCORDING TO AGE AND SEX

AGE	MALE		FEMALE		TOTAL	
	NO	%	NO	%	NO	%
21-30	1	0.62	3	1.85	4	**2.47**
31-40	9	5.56	7	4.32	16	**9.88**
41-50	16	9.88	11	6.79	27	**16.67**
51-60	32	19.75	19	11.73	51	**31.48**
61-70	29	17.90	20	12.35	49	**30.25**
>71	13	8.02	2	1.23	15	**9.25**
Total	**100**	**61.73**	**62**	**38.27**	**162**	**100%**

The maximum number of cases 19.75% (32 cases) studied in males was in the 51-60 age groups. In females the maximum numbers of cases were seen in the 61-70 age group 12.35 %(20 cases). Overall, in both males and females the

maximum number of cases was noted in the 6th and 7th decade 31.48 (51 cases) and 30.25(49 cases) respectively. (Dia.1&2)

TABLE-2

DISTRIBUTION OF PATIENTS ACCORDING TO SEX

Age	21-30	31-40	41-50	51-60	61-70	>71	Total
Male	1	9	16	32	29	13	**100**
Female	3	7	11	19	20	2	**62**
M:F	**1.00:3**	**1.29:1**	**1.45:1**	**1.68:1**	**1.45:1**	**6.5:1**	**1.61:1**

Males constituted 61.73% (100 cases) of the cases where as females made up the remaining 38.27 %(62 cases). The sex ratio obtained in the study was 1.61:1 with a range varying from 1:3 to 6.5:1. Except for the third decade all other decades showed a male predominance. (Dia.3)

TABLE-3

DISTRIBUTION OF PATIENTS ACCORDING TO SITE

SITE	MALE	%	FEMALE	%	TOTAL	%
BM	36	22.22	23	14.20	59	**36.42**
Tongue	40	24.69	17	10.49	57	**35.18**
Alveolus	6	3.70	10	6.17	16	**9.87**
HP	11	6.79	3	1.85	14	**8.64**
LIP	4	2.47	7	4.32	11	**6.79**
RMT	1	0.62	-	-	1	**0.62**
FOM	2	1.24	2	1.24	4	**2.48**
TOTAL	**100**	**61.73**	**62**	**38.27**	**162**	**100**

RMT= Retro molar trigone, FOM= Floor of mouth, HP=Hard palate

The study revealed that the buccal mucosa was most commonly involved in both the sexes 36.42 %(59 cases) followed by the tongue 35.18 %(57 cases), alveolus, hard palate, lip, floor of mouth and retromolar trigone.

In males tongue 24.69 %(40 cases) followed by buccal mucosa 22.22 %(36 cases), hard palate, alveolus, lip, floor of mouth and retromolar trigone were most commonly involved.

In females buccal mucosa was the most frequently involved site14.20 %(23 cases). Tongue was the second most commonly involved site 10.49 %(17 cases) followed by alveolus, lip, hard palate and floor of mouth in that order. No case involving the retromolar trigone was reported in females. (Dia.4)

TABLE-4

DISTRIBUTION OF PATIENTS BASED ON THEIR HABITS

Habit	Male	%	Female	%	Total	%
BT	25	15.43	52	32.10	77	**47.53**
SA	17	10.49	-	-	17	**10.49**
BTSA	12	7.41	-	-	12	**7.41**
BTS	10	6.17	-	-	10	**6.17**
BTA	7	4.32	-	-	7	**4.32**
BS	7	4.32	-	-	7	**4.32**
BSA	6	3.70	-	-	6	**3.70**
BA	6	3.70	-	-	6	**3.70**
S	6	3.70	-	-	6	**3.70**
NO RISK	4	2.48	10	6.18	14	**8.66**

B=betel nut, S=smoking, T=tobacco, A=alcohol.

The habit that was most prevalent among both males and females was quid chewing; seen in 47.53% (77 cases). In males quid chewing 15.43% (25 cases) followed by smoking combined with alcohol consumption10.49% (17 cases) and quid chewing with smoking and alcohol 7.41% (12 cases) were noted. In females the most common habit was chewing quid seen in 32.10% (52 cases). Around 6.18% (10 cases) of females had no identifiable risk factors. (Dia.5)

TABLE-5

DIFFERENT MODES OF PRESENTATION

CF	BM	TONGUE	LIP	ALVEOLUS	HP	FOM	RMT	%	TOTAL
ULCER	55	57	8	16	10	4	1	93	**151**
SWELLING	25	17	8	9	8	2	-	42.6	**69**
PAIN	1	10	-	2	6	3	3	15.43	**25**
TRISMUS	5	-	-	2	-	-	2	11.73	**9**
RMT EXT	8	-	-	3	-	-	2	8.02	**13**
OCF	5	-	-	-	-	-	-	3.09	**5**
ES	20	20	-	-	-	-	-	24.7	**40**
DC	12		-	-	-	-	-	7.40	**12**
DYSPHAGIA	-	7	-	-	-	-	-	4.32	**7**
AG	-	10	-	-	-	-	-	6.17	**10**
LUMP NECK	-	4	-	-	-	-	-	2.47	**4**

CF=clinical features, BM=buccal mucosa, ES=excessive salivation, DC=difficulty in chewing, AG= ankyloglossia.

The most common symptom was an ulcer in the mouth 93% (151 cases). Swelling in the oral cavity was the next most common symptom seen in 42.6% (69 cases). Excessive salivation was the third most common symptom seen in 24.7% (40 cases). Pain was seen in 15.43% (25 cases) and was the next major presenting feature. Just 2.47% (4 cases) presented with a lump in the neck. (Dia.6)

TABLE-6

ASSOCIATION OF VARIOUS PREMALIGNANT LESIONS

The most common premalignant condition encountered in the study was

S.NO	PRE-MALIGNANTLESION	TOTAL	%
1	Candidiasis	7	**4.32**
2	Erythroplakia	21	**12.96**
3	Sub mucosal fibrosis	14	**8.64**
4	Leukoplakia	55	**33.95**
5	Erythroleukoplakia	8	**4.95**
6	Submucosalfibrosis+erythroleukoplakia	6	**3.70**
7	No association	50	**30.86**

leukoplakia 33.95% (55 cases). Around 30.86% (50 cases) in the study had no identifiable premalignant condition. (Dia.7)

TABLE-7

CORRELATION BETWEEN SITE OF OCCURENCE AND CLINICAL PATTERN

Site	Ulcerative		Proliferative		Ulceroproliferative		Total
	No	%	No	%	No	%	
BM	35	21.6	4	2.47	20	12.35	**59**
Tongue	40	24.69	-	-	17	10.49	**57**
FOM	2	1.23	-	-	2	1.23	**4**
Alveolus	7	4.32	-	-	9	5.55	**16**
RMT	1	0.63	-	-	-	-	**1**
LIP	3	1.85	3	1.85	5	3.09	**11**
HP	6	3.70	2	1.23	6	3.70	**14**
Total	**94**	**58.03**	**9**	**5.55**	**59**	**36.42**	**162**

Overall ulcerative pattern of growth was found to be the most common in the study 58.03% (94 cases). Ulceroproliferative pattern was the second most common 36.42 %(59 cases) and proliferative pattern of growth was the least common accounting for 5.55% (9 cases). Ulcerative lesions were most common in the tongue 24.69% (40 cases) followed by the cheek 21.6% (35 cases), FOM, alveolus, HP, lip and RMT. Ulceroproliferative lesions were more prevalent in the cheek 12.35% (20 cases) followed by the tongue, alveolus, lip, HP and FOM (DIA-8).

TABLE-8

DISTRIBUTION ACCORDING TO VARIOUS HISTOLOGICAL TYPES

S.NO	TYPE	NO	NO & %	%
1	SCC-grade I	72	152(93.83%)	**44.44**
2	SCC-grade II	56		**34.57**
3	SCC-grade III	24		**14.81**
4	Verrucous carcinoma	5		**3.70**
5	Melanoma	1		**0.62**
6	Adenoid Cystic carcinoma	3		**1.85**

Squamous cell carcinoma was the most common histological type and accounted for 93.83% (152 cases). Grade I SCC accounted for 44.44% (72 cases) and grade II accounted for 34.56 (56 cases). Grade III was the least common an accounted for 14.81% (24 cases). Verrucous carcinoma was the second most common histological type followed by melanoma and adenoid cystic carcinoma. (Dia.9)

TABLE-9

STAGE WISE DISTRIBUTION OF PATIENTS

S.NO	STAGE	NO	%
1	I	8	**4.93**
2	II	23	**14.20**
3	III	52	**32.10**
4	IV	79	**48.76**

In the study most patients presented in stage-IV, 48.76% (79 cases). Stage- III patients were second most common 32.10% (52 cases). Thus most patients presented late as stage III and stage IV. Stage I and II patients were comparatively less. (Dia.10)

TABLE-10

DISTRIBUTION OF PATIENTS ACCORDING TO SOCIOECONOMIC STATUS

S E STATUS	NO	%
LOW	**161**	**99.38**
MIDDLE	**1**	**00.62**
UPPER	**-**	**-**

Majority of the patients were overwhelmingly from a low socioeconomic stratum 99.38% (161 cases) (Dia-11).

TABLE-11

DISTRIBUTION OF PATIENTS ACCORDING TO PRIMARY LESION & NODAL STATUS

PRIMARY LESION			NODAL STATUS			METASTASIS	
T	**N0**	**%**	**N**	**N0**	**%**	**M**	**N0**
T0	-	**-**	**N0**	28	**14.20**	**M0**	162
T1	12	**4.32**	**N1**	55	**29.63**	**M1**	-
T2	39	**19.14**	**N2a**	12	**14.81**		
T3	43	**26.54**	**N2b**	50	**30.86**		
T4	68	**50**	**N2c**	13	**8.02**		
			N3	4	**2.47**		

In the study most patients presented with advanced lesion T4 (68 cases) N2 (75 cases). The number of patients who presented with T3 lesion was (43 cases); the proportion of T2 and T1 cases was less. Most of the cases presented with N2 nodal disease (75 cases). The proportion of cases with N1disease was (55 cases).Cases with N3 disease was very low (4 cases). There were no cases with distant metastases (Dia -12,13,14).

TABLE-12

NUMBER OF PATIENTS OPERATED BASED ON STAGE

STAGE	NUMBERS
I	8
II	23
III	14
IV	19

31 cases with stage I & II disease and 33 cases with stage III & IV had surgery.(Dia.10)

TABLE- 13

NUMBER OF PATIENTS OPERATED BASED ON SITE AND HISTOLOGY

Type	BM	Tongue	HP	Alveolus	Lip	Total
SCC	18	22	-	2	1	43
Salvage-SCC	4	3	-	3	2	12
ACC	-	-	2	-	1	3
Verrucous	4	-	-	-	2	6
Total	**26**	**25**	**2**	**5**	**6**	**64**

Of the total 64 patients who had surgery, 43 patients were offered surgery as the primary treatment. 12 patients had surgery following chemoradiation. 3 patients with ACC and 6 patients with verrucous carcinoma had surgery. Most of the patients with oral cavity cancers who reported at late stages opted for non-operative treatment. Overall 39.51% of patients with oral cavity cancers underwent surgery. (Dia.15&16)

TABLE-14

PATIENTS WHO UNDERWENT SURGERY FOR VERUCCOUS CARCINOMA

Surgery	Site	No	Recurrence	Defaulter	Death
WLE,DPF	BM	1	-	-	-
WLE,FHF	BM	2	-	-	-
WLE,NLF	BM	1	-	-	-
WLE,FHF	Lower lip	1	-	-	-
WLF.ERF	Lower lip	1	-	-	-
Total	**BM-3,Lip-2**	**6**	**-**	**-**	**-**

No recurrences were reported among the six patients who were operated for veruccous carcinoma. (Fig.6, 7, 8, 9&10)

TABLE-15

PATIENTS WHO HAD SURGERY FOR ACC WHO DEVELOPED RECURRENCE

Surgery	Site	No	Recurrence	Defaulter
WLE	Hard palate	2	-	1
WLE,AF,FHF	Upper lip	1	-	-
Total	**HP-2,Lip-1**	**3**	**-**	**1**

There were no recurrences in the 3 patients with ACC who had surgery. One patient defaulted.

TABLE-16

BUCCAL MUCOSA STATISTICS

Procedure	No	Post RT	Post CRT	Recurrence	Defaulter	Death
WLE	1	-	-	1	-	-
WLE,DPF	1	-	-	-	-	-
WLE,FHF	8	-	-	-	-	-
WLE,SOHND, FHF	6	6	-	-	1	-
WLE,DPF, RND	1	-	1	1	-	-
WLE,HM, PMMCF,RND	1	-	1	1	-	-
Total	**18**	**6**	**2**	**3**	**1**	**-**

LIP STATISTICS

Procedure	No	Post RT	Post CRT	Recurrence	Defaulter	Death
WLE,FHF	1	-	-	-	-	-
Total	**1**	**-**	**-**	**-**	**-**	**-**

ALVEOLUS STATISTICS

Procedure	No	Post RT	Post CRT	Recurrence	Defaulter
HM,SOHND,PMMCF	2	2	-	-	1
Total	**2**	**2**	**-**	**-**	**1**

TONGUE STATISTICS

Procedure	No	Post RT	Post CRT	Recurrence	Death
HG,RND	9	-	8	1	-
HG,SOHND	7	7	-	1	-
HG,ESOHND	1	1	-	-	-
WLE,SOHND	4	4	-	1	-
HG,HM,RND,PMMCF	1	-	1	-	1
Total	**22**	**12**	**9**	**3**	**1**

TABLE-17

DISTRIBUTION OF PATIENTS ACCORDING TO ADJUVANT THERAPY

Surgery	Post surgery RT		Post surgery CRT	
43	No	%	No	%
	20	46.51	11	25.58

Totally only 43 patients with SCC were operated as many opted for non invasive therapies for fear of disfigurement, prolonged hospitalization. Many patients also defaulted following CRT. On top of all, most presented late making surgery very difficult. 22 cases of tongue, 18 cases of buccal mucosa, a case of lip, and two cases of alveolus were operated. Totally six cases of recurrence were reported, three in the tongue and three in buccal mucosa. A postoperative death was also reported. Patients with recurrence were subjected to chemoradiotherapy (Table-16). Most of the patients received radiotherapy 46.51% (20 cases) and chemoradiotherapy 25.58% (11 cases) following surgery for effective locoregional control (Table-17) (expect those who were operated for veruccous and ACC not). (Fig.11, 12, 13, 14, 15&16)

TABLE-18

DISTRIBUTION OF PATIENTS ACCORDING TO RESPONSE TO CHEMORADIOTHERAPYT

Site	ChemoRT	Response		No response		Defaulter		% failure
	No	No	%	No	%	No	%	
Alveolus	14	3	4.41	3	4.41	8	11.76	16.17
BM	27	6	8.82	4	5.88	17	25	42.64
FOM	2	2	2.94	-	-	-	-	-
HP	11	7	10.29	-	-	4	5.88	5.88
Lip	5	3	4.41	2	2.94	-	-	2.94
RMT	1	1	1.47	-	-	-	-	-
Tongue	8	4	5.88	3	4.41	1	1.47	5.88
Total	**68**	**26**	**38.23**	**12**	**17.64**	**30**	**44.11**	**61.75**

Chemoradiotherapy was given as the definitive treatment for advanced stages (stage 3 and 4) at a dose of 66 Gy (2.0 Gy/day for 5 days/week for a total of 6 weeks in 28-35 sittings) for primary and 50 Gy (2.0 Gy/day for 5 days/ week for a total of 6 weeks) for neck combined with cisplatin at a dose of 100 mg/ m^2, 5-FU at 1000 mg/m^2as infusion on 1,22nd and 43rd days. Of the 41.97% (68 cases) persons who were treated with chemoradiation 38.23% (26 cases) showed a response whereas17.64 %(12cases) had residual disease and underwent salvage surgery. 44.11% (30 cases) defaulted.

TABLE-19

DISTRIBUTION OF PATIENTS ACCORDING TO SALVAGE SURGERY

Surgery	Site	No	Recurrence	Defaulter	Death
CRT,CR,PMMCF, RND	BM	3	-	1	-
CRT,WLE,FHF, SOHND	BM	1	-	-	-
CRT,CR,PMMCF, RND	Tongue	2	-	1	-
CRT,HG,SOHND	Tongue	1	-	-	-
CRT,WLE,ERF, SOHND	Lip	2	-	-	-
CRT,CR,PMMCF, RND	Alveolus	3	-	-	-
Total		**12**	**-**	**2**	**-**

Of the 17.64% (12 cases) who underwent salvage surgery there was no recurrences whereas two patients defaulted**.**

TABLE-20

DISTRIBUTION OF PATIENTS ACCORDING TO RESPONSE TO RADIOTHERAPY

Site	No	Response		No response		Defaulter		% failure
		No	%	No	%	no	%	
Alveolus	-	-	-	-	-	-	-	-
BM	10	-	-	8	19.51	2	4.88	4.88
FOM	2	-	-	-	-	2	4.88	4.88
Lip	2	-	-	-	-	2	4.88	4.88
HP	1	-	-	1	2.43	-	-	-
Tongue	26	-	-	6	16.63	19	46.34	46.34
Total	**41**	**-**	**-**	**15**	**36.59**	**25**	**60.98**	**97.56**

1 death occurred during treatment

Overall 25.30% (41 cases) with advanced inoperable disease received palliative RT. 36.59% (15 cases) did not show any response. Most of the patients 60.98% (25cases) defaulted and one death was documented. On account of this attrition no meaningful outcome could be deduced.

A patient with malignant melanoma was treated with chemotherapy. Follow up could not be done as the patient defaulted.

TABLE-21

DISTRIBUTION OF PATIENTS ACCORDING TO RESPONSE TO VARIOUS MODALITIES OF TREATMENT

Regimen	No	Complete response		Failure		Death	Defaulter	
		No	%	No	%		No	%
Surgery+CT+RT	23	18	78.26	2	8.70	1	2	8.70
Surgery+RT	20	16	80.00	2	10	-	2	10
Surgery	21	18	85.71	2	9.52	-	1	4.76
Chemo RT	68	26	38.23	12	17.64	-	30	44.11
PalliativeRT	41	-	-	15	36.58	1	25	60.98
Chemotherapy	1	-	-	-	-	-	1	100

The study revealed the fact that multimodal therapy had a very good outcome. 78.26% (18 cases) of patients who received surgery with chemoradiotherapy showed a favourable outcome. Comparatively, patients who received surgery only showed a positive response of 85.71% (18 cases). Surgery combined with RT had a response of 80 %(16 cases). Chemoradiotherapy had a poor outcome with 38.23% (26 cases) showing a positive response. Many of the patients who received palliative RT defaulted 60.98 %(25 cases). Overall many patients defaulted 36.41% (59 cases) on account of lengthy treatment schedules, a slow response, numerous adverse effects and surgery associated morbidity**.**(Dia.17)

DISCUSSION

Carcinoma of the Oral cavity is one of the most common carcinomas in India. (Elango *et al*.; Mehrotra *et al*.; Yeole *et al.,* 2006). In Southeast Asia squamous cell carcinoma is the most commonly encountered oral cavity malignancy and is the sixth most common cancer worldwide (Al-Swiahb *et al*., 2010).Indian are at a high-risk for oral cancers due to a high prevalence of predisposing habits like tobacco chewing (in both sexes), smoking and alcohol consumption (in males) (Yeole *et al*., 2003). India accounts for around 25% of oral cavity cancers (Parkin *etal.*, 1999). Apart from these risk factors, poor oral hygiene, dietary risk factors, low literacy levels, gender etc are associated with a high risk of oral cancer (Güneri *et al*., 2005).Despite improvements in diagnosis and loco-regional treatment, there has not been any major increase in the long-term survival of oral cancer patients and it's still low when compared with other major cancers worldwide (Swango, 1996; Shiboski *et al*., 2000). In a recent study, the observed 5-year survival rate in an Indian population was reported to be as low as 30.5% (Yeole *et al*., 2003). Such low survival rates can be attributed to advanced age and advanced clinical stage at time of presentation. Lots of factors influence the outcome of oral cavity cancers; tumour-related factors like the degree of differentiation, site of tumour, size of tumour, etc to name a few. The present study is aims to analyze the incidence of oral cancers,

discuss various risk factors, determine the median stage of presentation, and assess the various modalities of treatment strategies

Our study comprised 162 patients, 100 of which were male and 62, female. The gender distribution we got in our study correlated with a few of the studies in the recent past (Mehrotra *et al*.). Some studies have reported a higher incidence of oral cavity cancers in females (Kumar *et al*., 2001; Güneri *et al*.). Few other studies have reported an increasing trend of oral cavity cancers in females (Gaitán-Cepeda *et al*., 2010; Girod *et al.*, 2009).

Our study showed a ratio of 1.61:1 favoring males. This was consistent with certain European studies[88], the Alberta study (ratio of 2:1), in United States (ratio of 3:1) and studies from Pakistan & India all of which showed a male predominance. In high risk countries like India, Pakistan and Bangladesh, and Srilanka, oral cavity cancers are the most common cancer in men and account for up to 30% of all new cases of cancer compared to just 3% in the UK and 6% in France.[90] This trend is due to the greater use of tobacco, betel nut and alcohol by men than women in these countries. Greece reported a higher number of female cases. (Zavras A.I., *et al).*another study from Lahore[89] also showed female predominance with the ratio of 1.5:1.

The risk of developing oral cancer increases as one ages[91]. In our study 70.98% cases were over 50 years of age with the majority of patients presenting in the sixth and seventh decade. In the Alberta cancer registry, the maximum incidence was noted in the fifth and sixth decades. The average age of onset in the United States was in the fifth decade and the mean age of diagnosis is 65 years (national cancer institute SEER programme) and more than 50% of cases occurred above the age of 60 years. In the UK most of the cases (86%) were above 50 years.[92]

In our study majority of patients (99.38%) with oral cancers were from a low socio-economic status.

The most common site involved in our study was the buccal mucosa (36.42%), followed by the tongue (35.18%), though the difference was only 1.24%. According to western literature (Watkinson *et al.*, 2000; Rivera *et al.*) oral tongue is considered to be the most commonly involved sub site in the oral cavity. Two cancer centers in the United States reported an increase in the proportion of oral tongue cancers diagnosed in men younger 40 years.[93-94] It was later confirmed after analyzing Scottish data that this increase was not restricted to the under 40 population but could be detected in all age groups till 65 years.

The most common risk factors identified in our study were betel nut, tobacco chewing (47.53%), smoking and alcohol intake. This was consistent with other

studies (Güneri *et al*.). Other risk factors included a low socio-economic status, gender, dietary habits and poor oral dental hygiene. The relatively higher incidence of buccal mucosa carcinoma in India can be attributed to our practice of chewing tobacco (Mehrotra *et al*.; Kumar *et al*.).

Majority of the patients reported an ulcer 151 cases in the mouth. Tumors of the oral cavity often ulcerate due to friction of the mucous membrane during eating and also due to infection. Though the lesions are initially painless, advanced lesions are often associated with pain. Other symptoms reported were excessive salivation, difficulty in chewing, dysphonia, dysphagia and ankyloglossia and trismus.

Squamous cell (93.83%) carcinoma was the most commonly encountered histological variety followed by Adenoid cystic carcinoma (1.85%), verrucous carcinoma (3.70%) and melanoma (0.62%). The National Cancer Data Base of USA shows the following data SCC - 86.3%, Verrucous - 2.0%. Further, 44.4% cases were well differentiated, 34.57% of cases were moderately differentiated and 14.81%% were poorly differentiated. This correlates with studies by Khanna et al. We did not encounter any case of multicentric origin of SCC as described by Slaughter DP et al. The degree of differentiation is an important prognostic factor in oral cavity cancers. Poorly differentiated cancers have a worse prognosis compared with well differentiated ones (Weijers *et al.*; Al-Swiahb *et al*., 2010). There can also be an association between the degree of

differentiation of the cancer and metastasis to regional lymph nodes, with less differentiated cancers more likely to metastasize (Rivera *et al.*).

Most of the patients presented with an ulcerative growth (58.03%). Ulceroproliferative growth was the second most common (36.42%) Proliferative pattern of growth was the least common (5.55%). These results were consistent with (Wahi et al1965, Khanna et al1985, Mehta 1990).

Most of the tumours we encountered were advanced. 48.76% of patients presented in stage IV and 32.10% of patients presented in stage III. In our study 50% of patients had T4 lesion and 26.54% had T3 lesion.29.63% of patients presented with N1, 53.69% of patients had N2 disease and 2.47% of patients presented with N3. This was in concordance with S Manuel et al and Y Okada et al[96-97] where cases presented early T3- 33.9% and T4- 43.2% and N1 19.5%, N2 43.2% and N3 28%. Compared to MD Anderson cancer center study and National Cancer Database Study the proportion of N0 neck was very low in our study 14.20%. This pattern of late stage of presentation could be due to low literacy rate, ignorance regarding the disease and poor referral system in our country.

Out of 162 patients in the study, 39.51% (64 cases) of patients underwent surgery for SCC, ACC and verrucous carcinoma, and salvage procedure after

chemoradiotherapy for residual lesion. Of these 32.81% (21 cases) patients managed with surgery alone showed good response 85.71%.this studies compared with Rodgers et al. 31.25% (20 cases) patients treated with surgery and postoperative radiotherapy showed response 80%.This was consistent with other studies Rodgers et al, Pernot et al[98] Lundahl et al Medical College of Virginia. 35.94% (23 cases) managed with multimodal treatment showed response rate 78.26%.These results were consistent with EORTC and RTOG studies[99-102] Janot et al. Surgery could not be performed on all patients because many of the patients presented late thus ruling out surgery, general condition of many patients was poor and presence of other co-morbid conditions contraindicated surgery, fear of surgery and failure to accept the limitations of surgery excluded many patients and the limited usefulness of surgery in advanced lesions further reduced the number of patients. Both radiotherapy and surgery are equally effective for early lesions. (Fein et al 2002,[104] M Krishnan Nair, R Sankaranarayanan). None of our patients received primary radiotherapy. One patient was treated with chemotherapy. 41.98%(68 cases) patients were treated with chemoradiotherapy, 38.23% (26 cases) of these patients responded well while 17.64%(12 cases) had a poor response and underwent salvage surgery, and failure rate of 61.75%.This was consistent with other studies Adelstein et al.[102] Palliative RT was given to a total of 25.31%(41 cases), 36.59% (15 cases) did not respond well and 60.98%(25 cases) defaulted.

For patients with early disease Stage I and II, a single modality treatment with either surgery or radiotherapy is recommended as survival benefit is similar in both these modalities. In contrast, in patients with locally advanced disease and advanced disease require a combined modality approach. Since the majority of oral cancers present at an advanced Stage III and IV, the therapy is more complex the prognosis guarded.[105] Surgery and radiation used together gives the maximum survival benefit at the cost of increased morbidity and complication. Role of chemotherapy is still unclear in oral squamous cell carcinoma.

Follow up was done monthly for the 1st year and once in 3months for the 2nd year during which six recurrences were reported in patients who were operated. Recurrences were managed with chemoradiotherapy. Out of 68 patients subjected to chemoradiotherapy, no recurrences were reported.

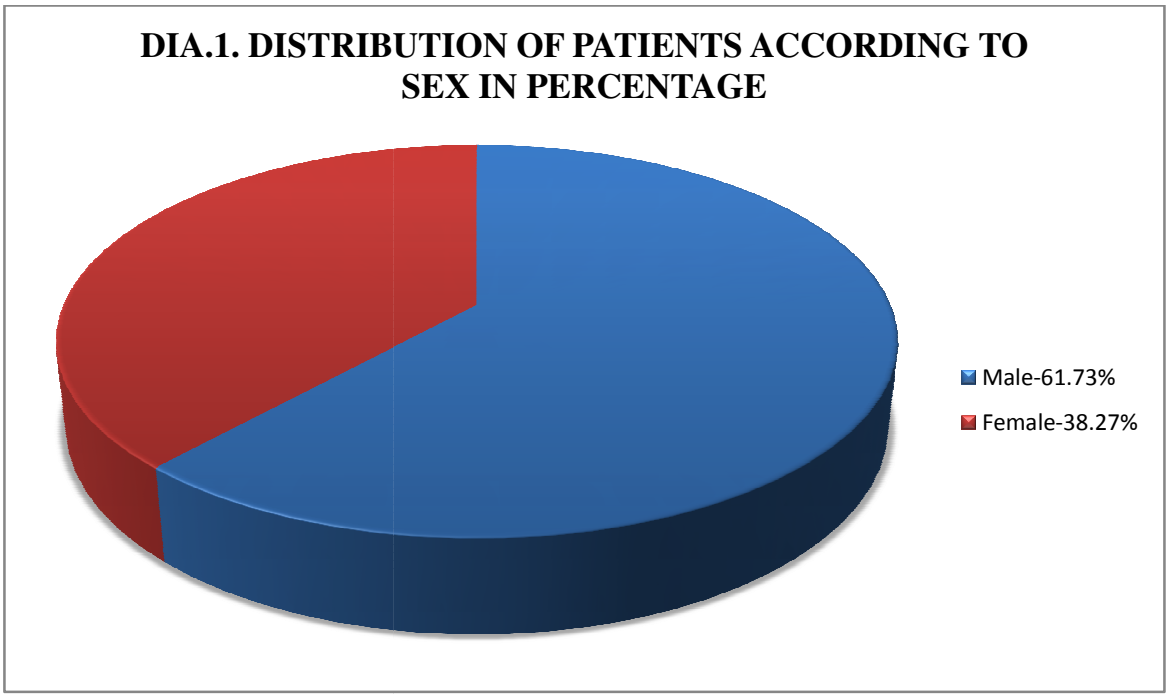
CONCLUSIONS

- The most common cancer of the oral cavity that we encountered was squamous cell carcinoma which accounted for 93.83% of the cases.
- In our study the buccal mucosa was most commonly involved (36.42%) followed by the tongue (35.18%) though the difference was negligible.
- Incidence of oral cancer was found to be highest in the 6^{th} & 7^{th} decades 31.48% & 30.25% respectively.
- There was a definite male preponderance with a male to female sex ratio of1.61:1.
- The most common etiological factor (in 47.53% of cases) was the habit of chewing betel leaf and tobacco with slaked lime (quid).It was also apparent that this habit was much more common in females 32.10% against 15.43% for males.
- The commonest mode of presentation in our study was an ulcer 93.0%.
- Majority of patients had an ulcerative type of growth 58.03% against 5.55% with a proliferative growth and 36.42% with an ulceroproliferative pattern of growth.
- Almost all of the cases were from a low socioeconomic stratum 99.38%.
- Lack of awareness among the general public about oral cancers and non availability of mechanisms for early diagnosis and referral are probably

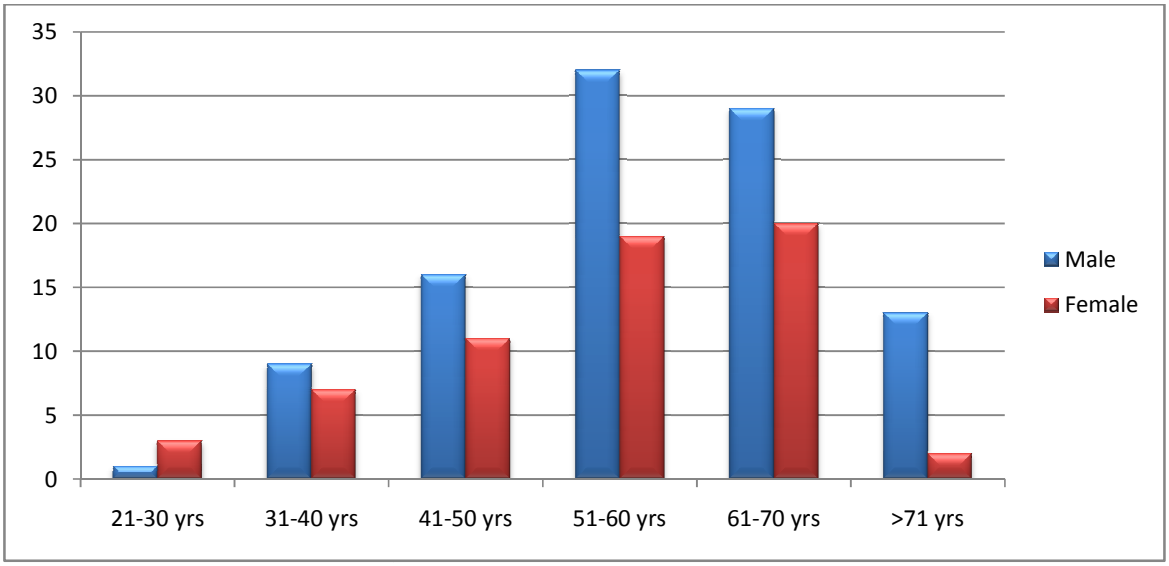
the reasons for majority of patients presenting in Stage III 32.10% and IV 48.76% in our study.

- There were no cases of distant metastasis Stage IVC
- Management of early oral cancers (Stage I & Stage II) with surgery yielded a good result; complete response was seen in 85.71% of cases. Likewise advanced stages were managed with a multimodal approach- either surgery with chemoradiotherapy in which 78.26% cure rate was achieved or surgery with radiotherapy alone in which 80.0% cure rate was seen.
- A post operative mortality was encountered.
- 41.97% of patients were given primary chemoradiotherapy and 38.23% responded completely while 17.64% of patients had residual disease and underwent salvage surgery.
- Around 25.30% of patients who presented late and who had inoperable tumours were managed with palliative radiotherapy.
- Our study was confounded by 36.41% defaulters. The recurrence rate was 9.38% following surgery.
- So we conclude that early lesions can be successfully managed with single modality treatment, either surgery or radiotherapy while advanced cases definitely requires a multimodal approach.

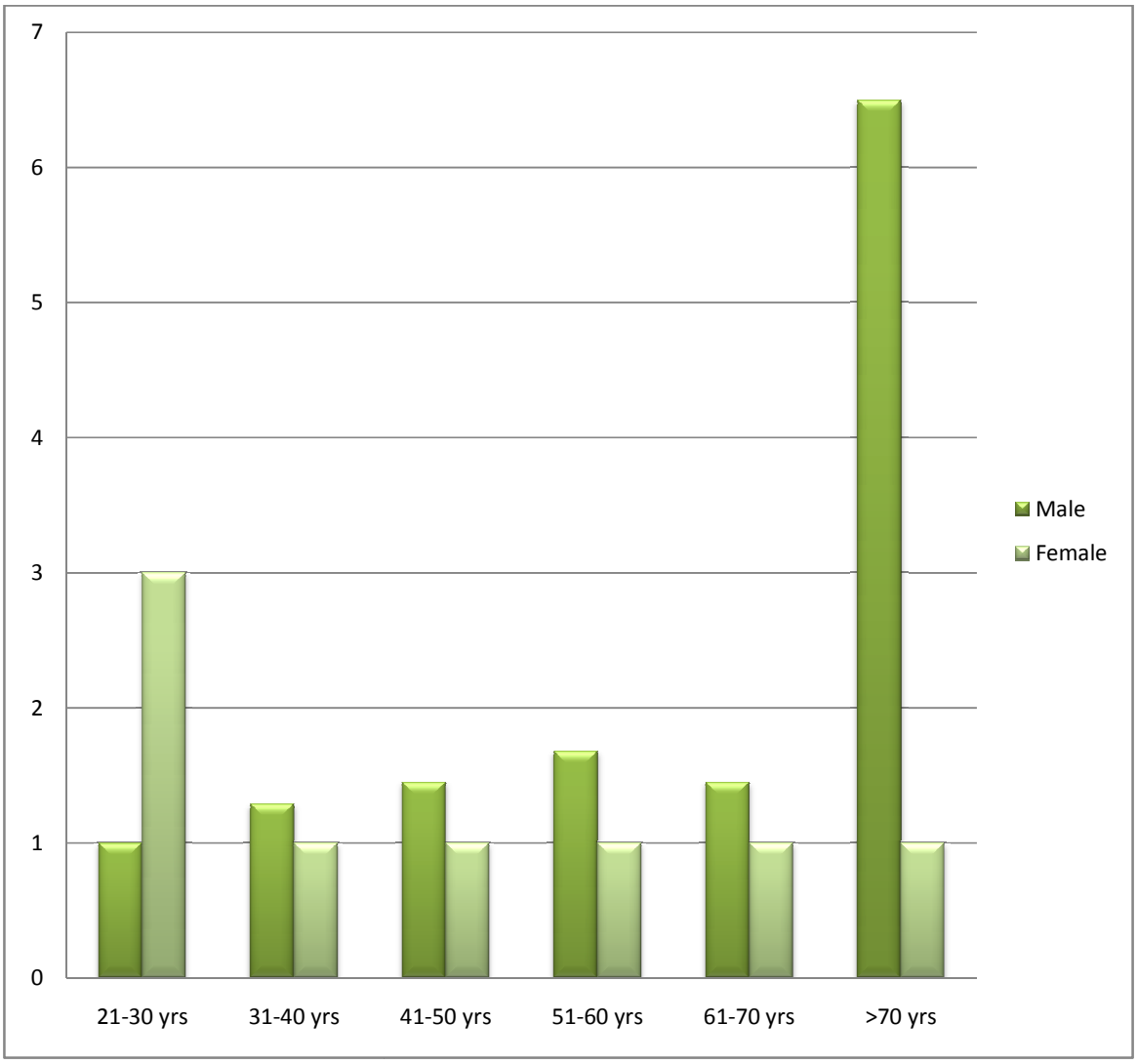
DIA.1. DISTRIBUTION OF PATIENTS ACCORDING TO SEX IN PERCENTAGE



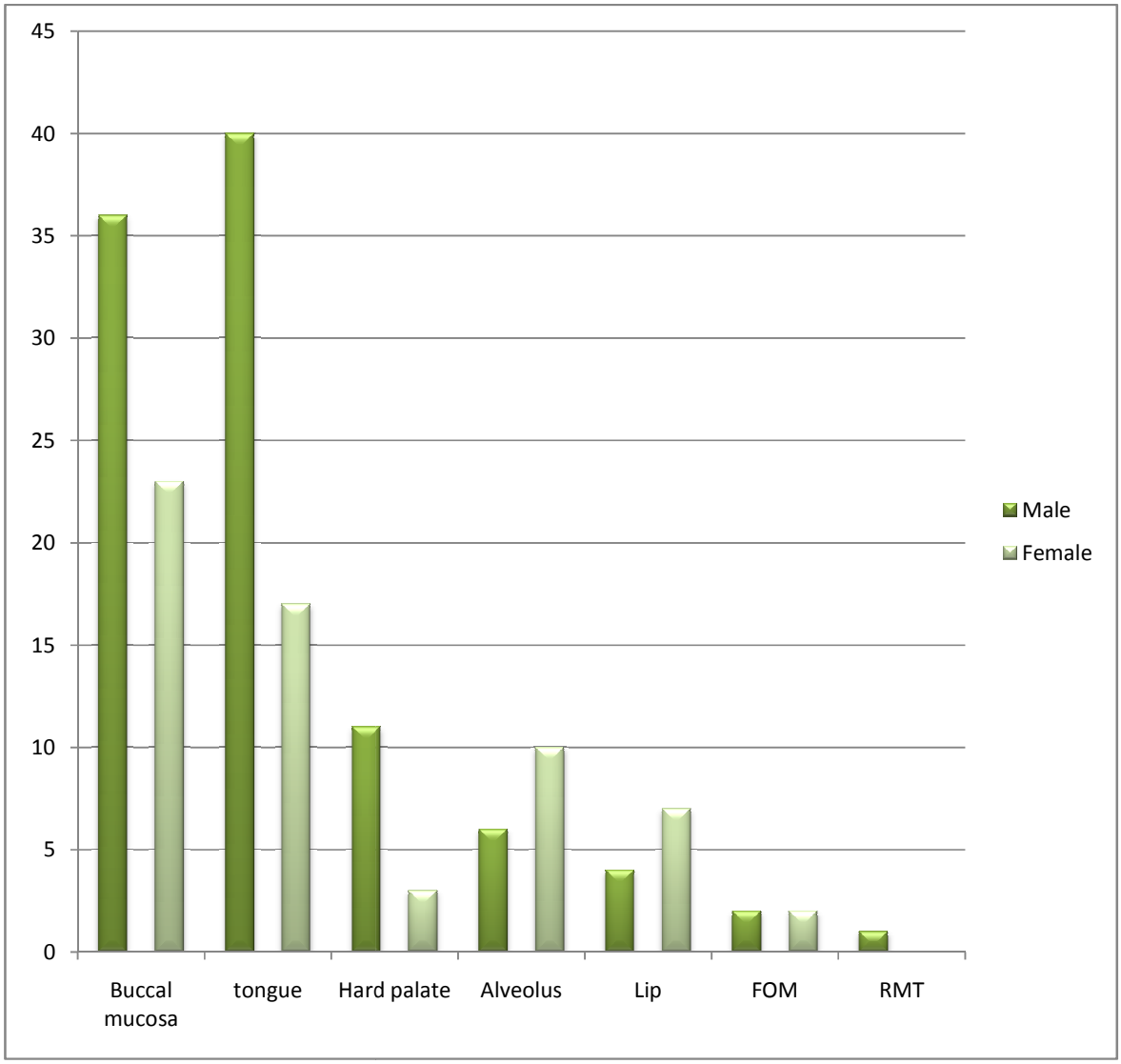
DIA.2. DISTRIBUTION OF PATIENTS ACCORDING TO AGE IN YEARS



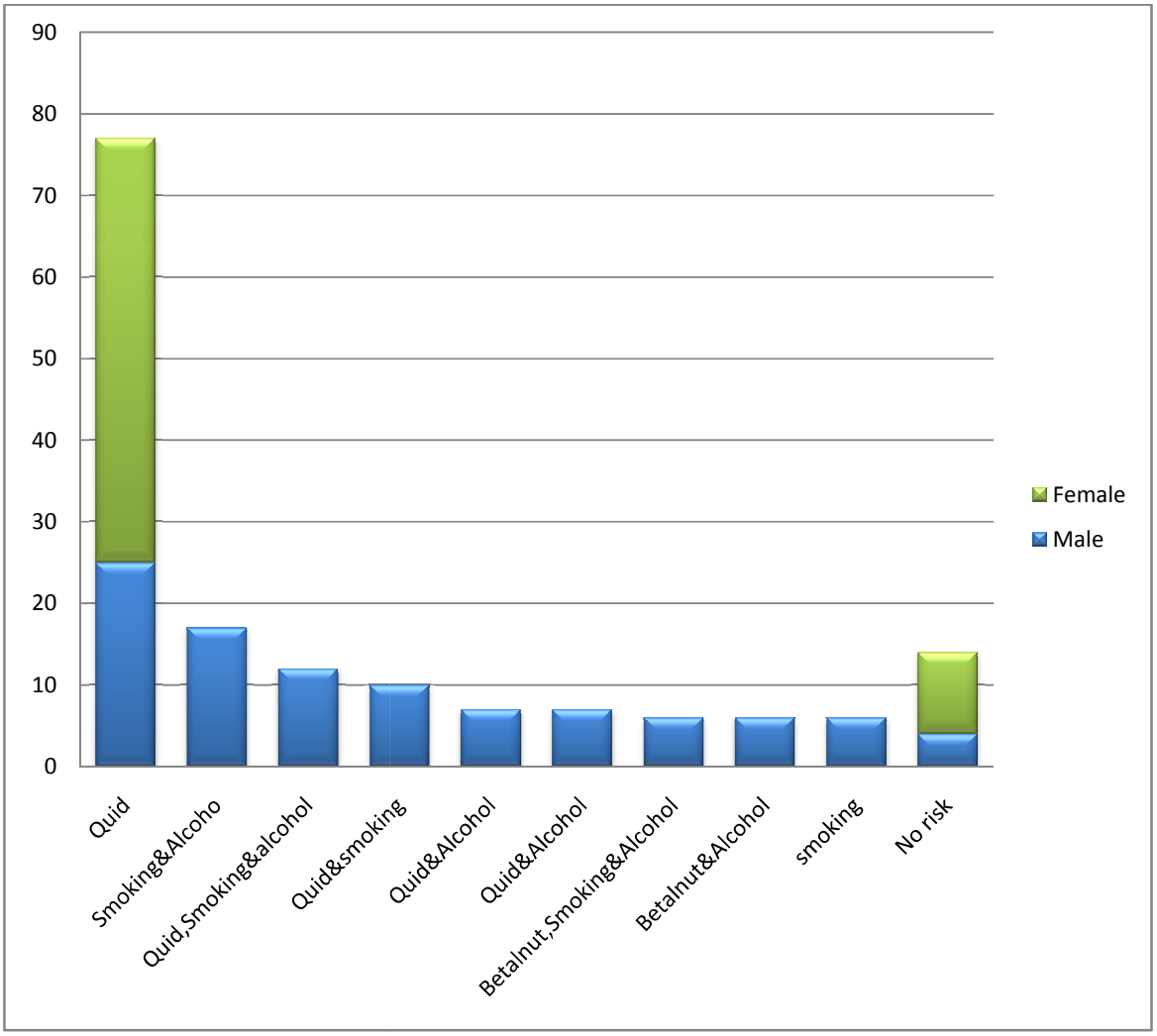
DIA.3. MALE TO FEMALE SEX RATIO

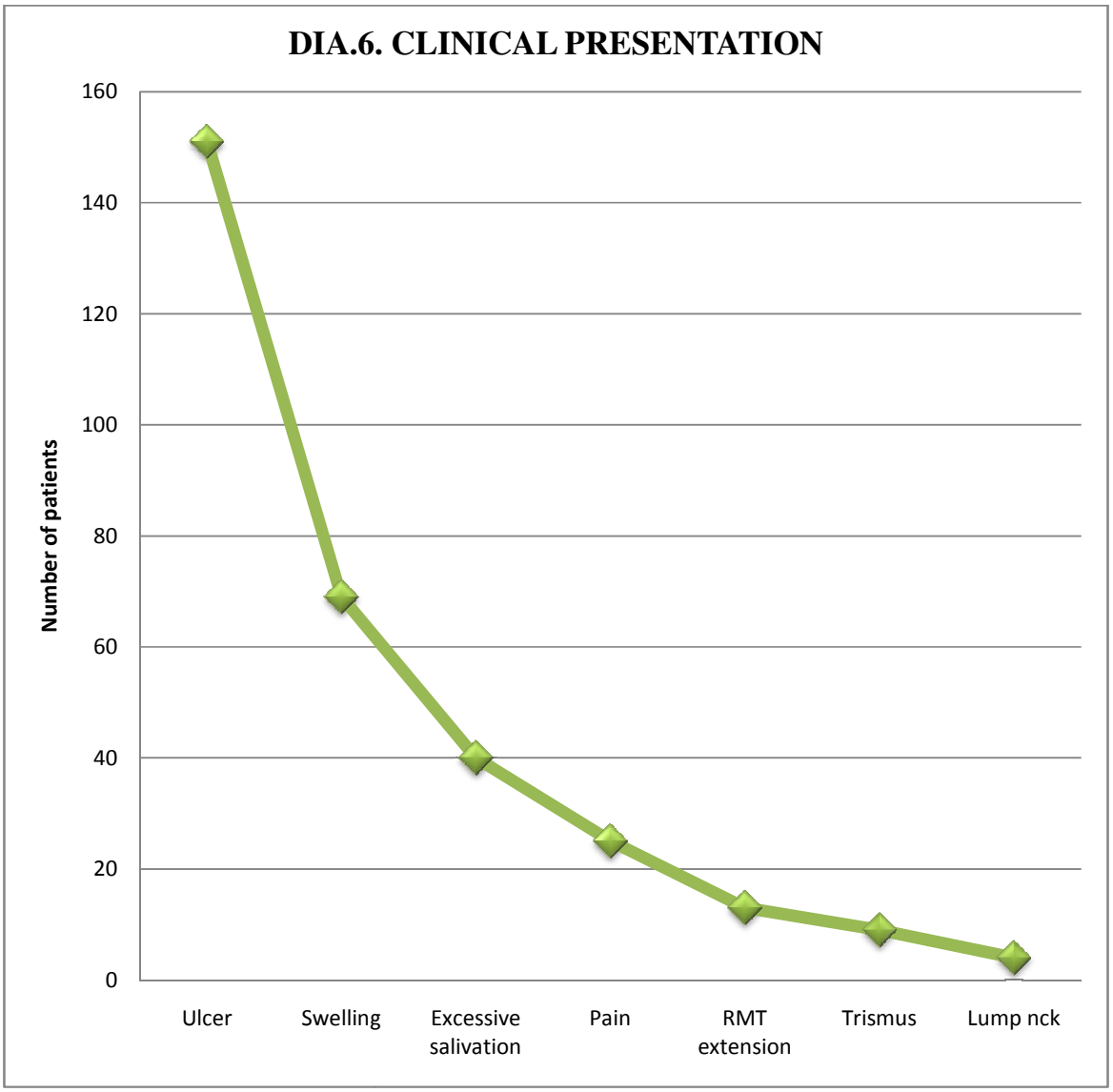


DIA.4. DISTRIBUTION OF PATIENTS ACCORDING TO SITE

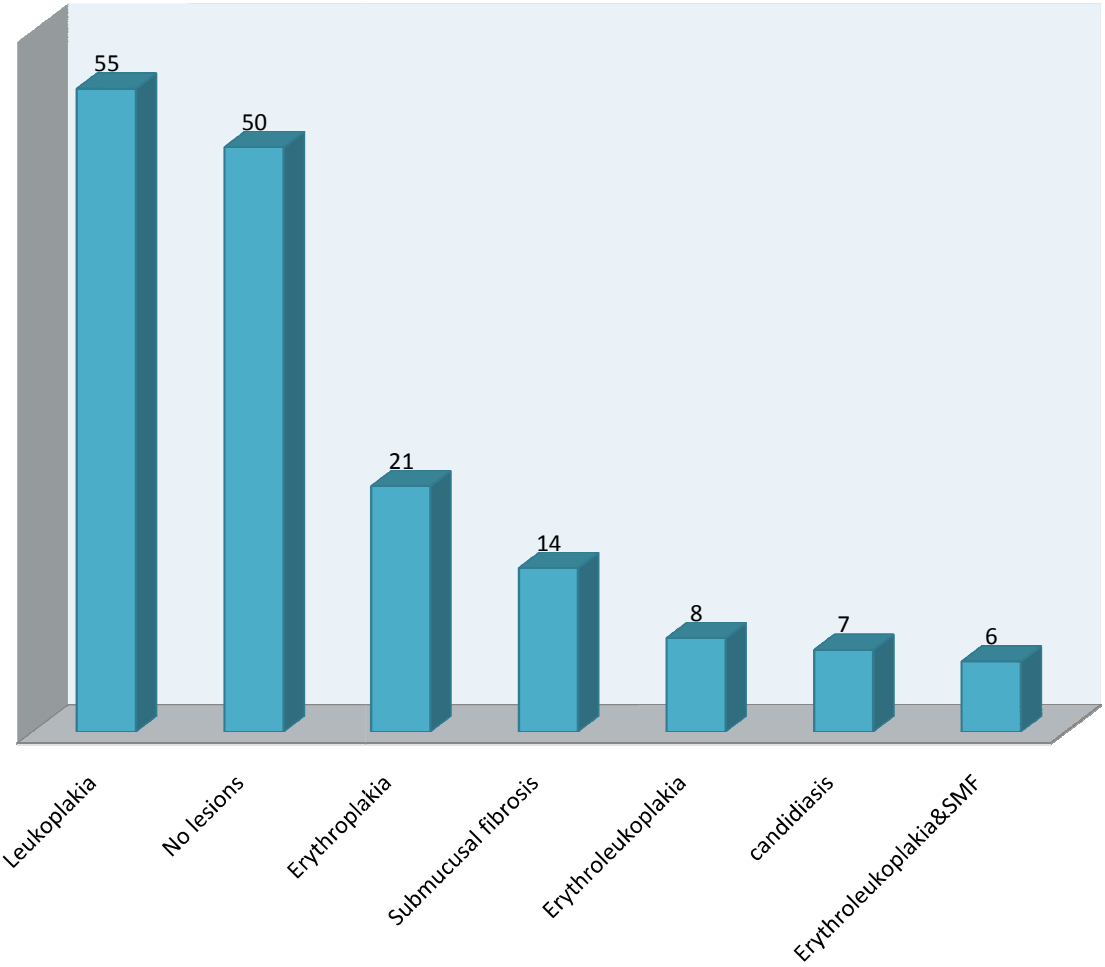


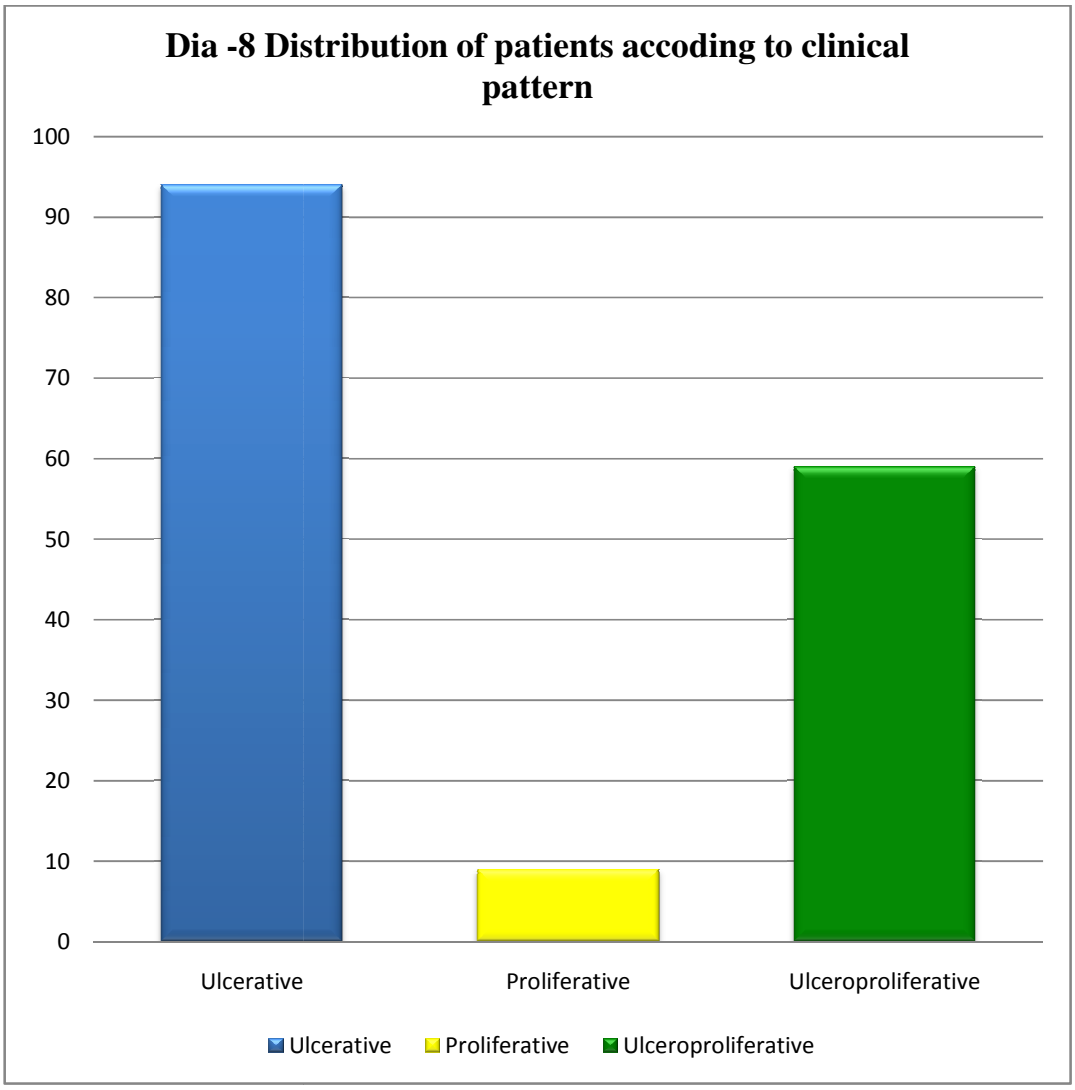
DIA.5. DISTRIBUTION OF PATIENTS ACCORDING TO HABITS



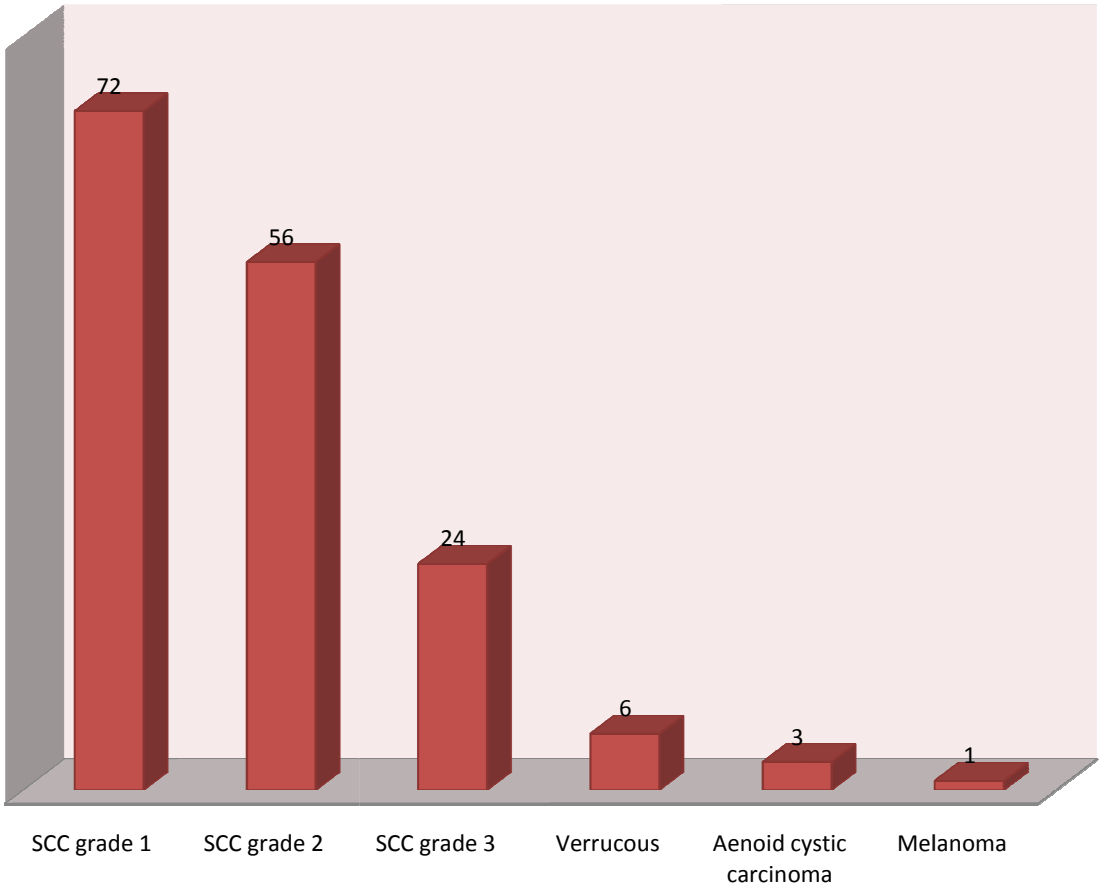

DIA.6. CLINICAL PRESENTATION
Number of patients
160
140
120
100
80
60
40
20
0
Ulcer
Swelling
Excessive salivation
Pain
RMT extension
Trismus
Lump nck

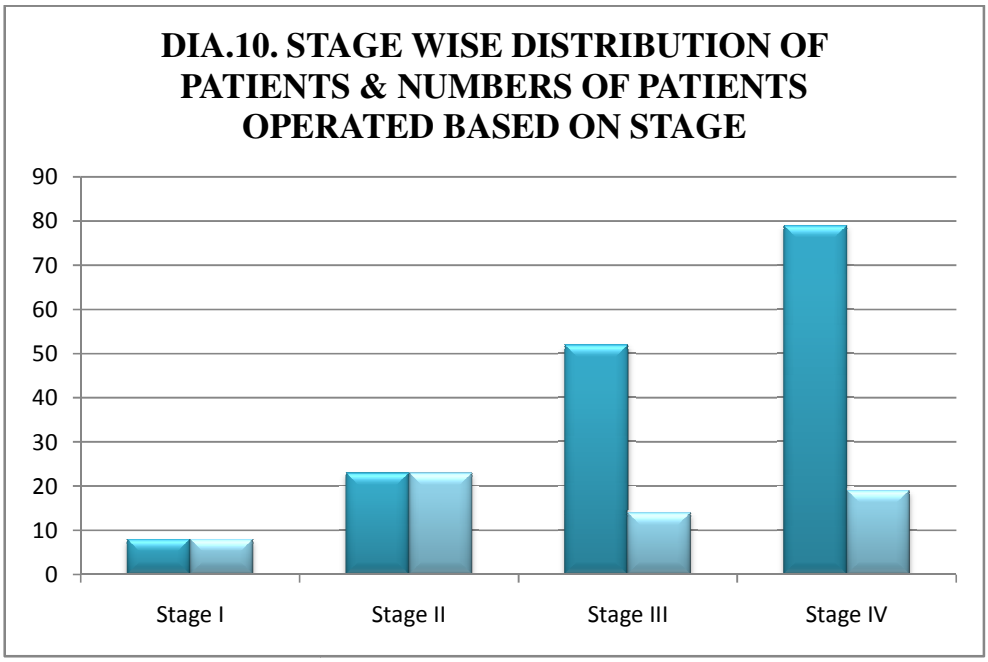
DIA.7. DISTRIBUTION OF PREMALIGNANT LESIONS IN PATIENTS

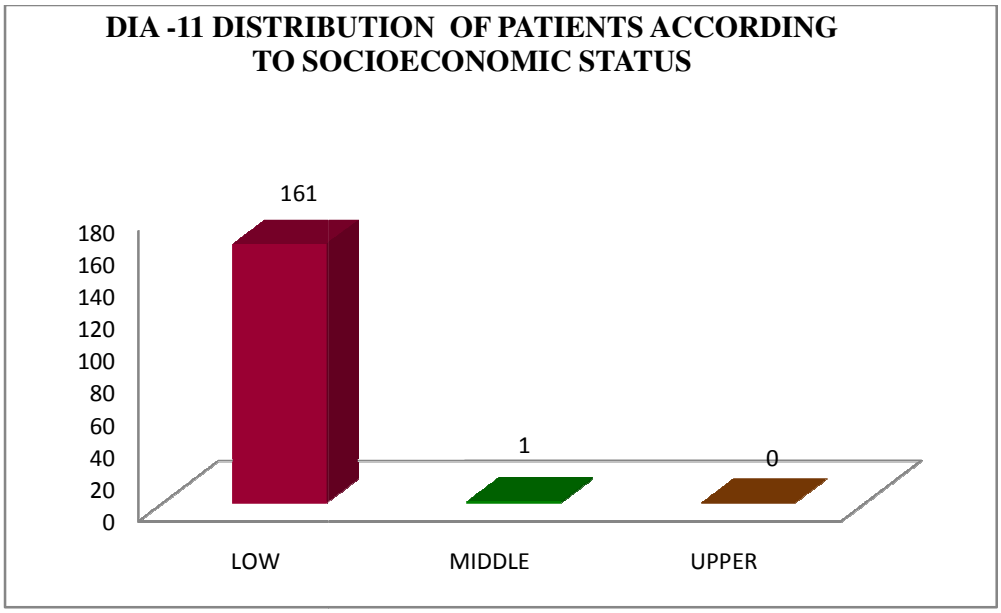



Dia -8 Distribution of patients accoding to clinical pattern
100
90
80
70
60
50
40
30
20
10
0
Ulcerative
Proliferative
Ulceroproliferative
Ulcerative
Proliferative
Ulceroproliferative

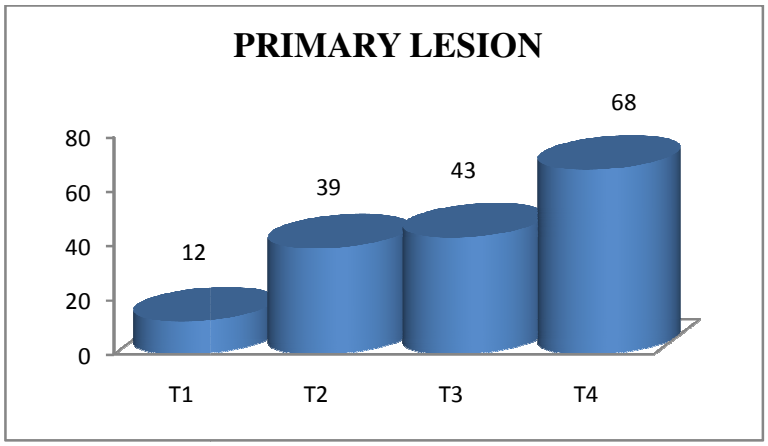
DIA.9. PATIENTS DISTRIBUTION ACCORDING TO HISTOPATHOLOGICAL TYPE

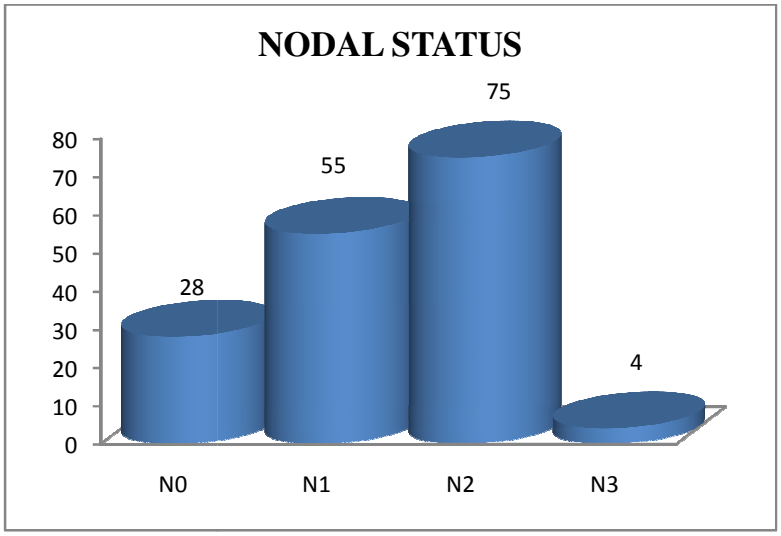


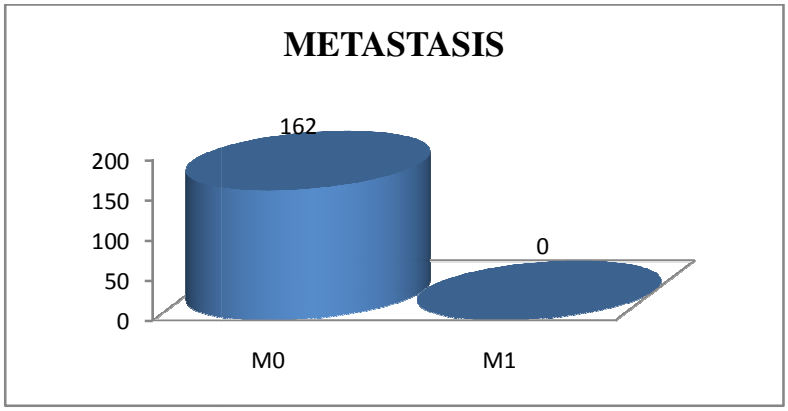


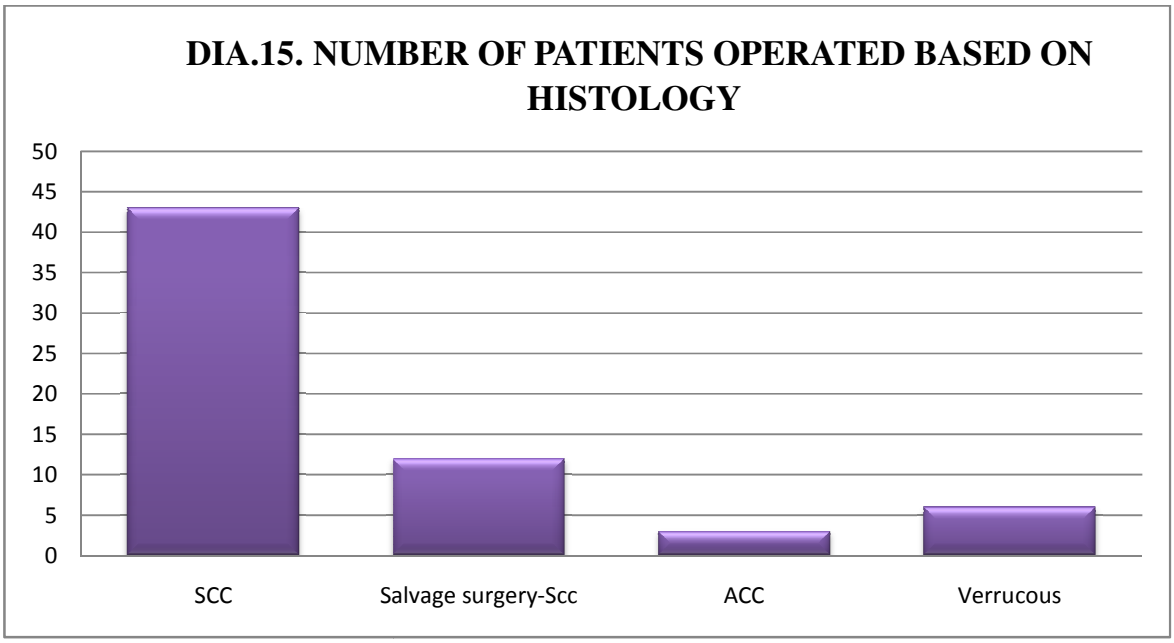


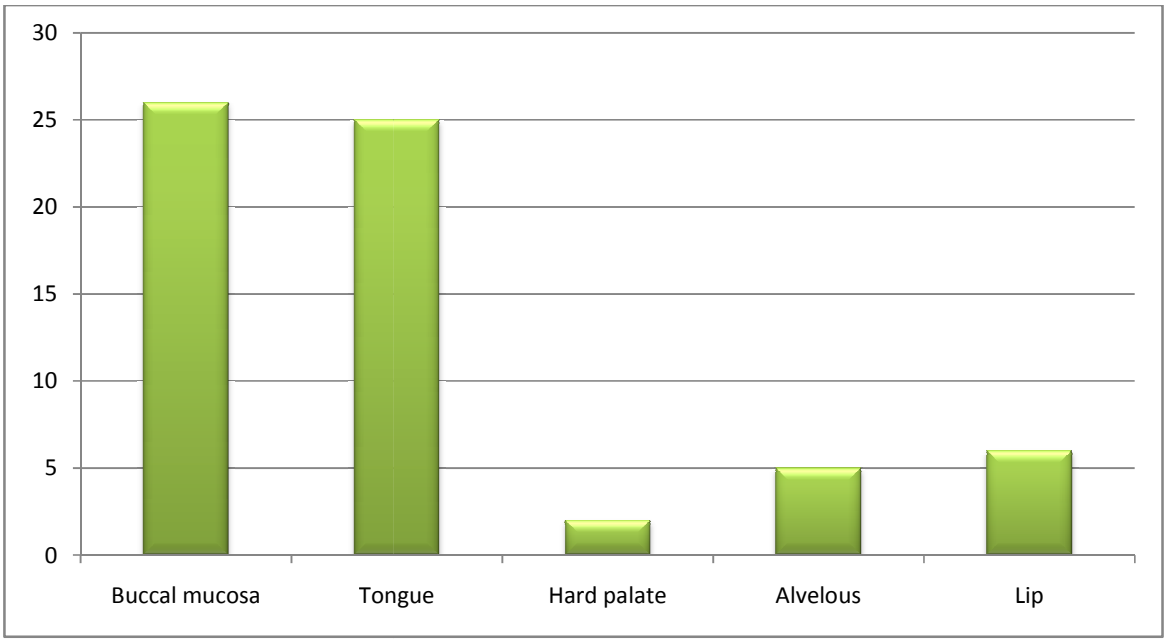
DIA 12,13,14 - DISTRIBUTION OF PATIENTS ACCORDING TO PRIMARY LESION & NODAL STATUS


PRIMARY LESION
80
60
40
20
0
12
39
43
68
T1
T2
T3
T4


NODAL STATUS
80
70
60
50
40
30
20
10
0
28
55
75
4
N0
N1
N2
N3


METASTASIS
200
150
100
50
0
162
0
M0
M1


DIA.15. NUMBER OF PATIENTS OPERATED BASED ON HISTOLOGY
50
45
40
35
30
25
20
15
10
5
0
SCC
Salvage surgery-Scc
ACC
Verrucous


DIA.16. NUMBER OF PATIENTS OPERATED BASED ON SITE
30
25
20
15
10
5
0
Buccal mucosa
Tongue
Hard palate
Alvelous
Lip

DIA.17. DISTRIBUTION OF PATIENTS ACCORDING TO RESPONSE TO VARIOUS MODALITIES OF TREATMENT

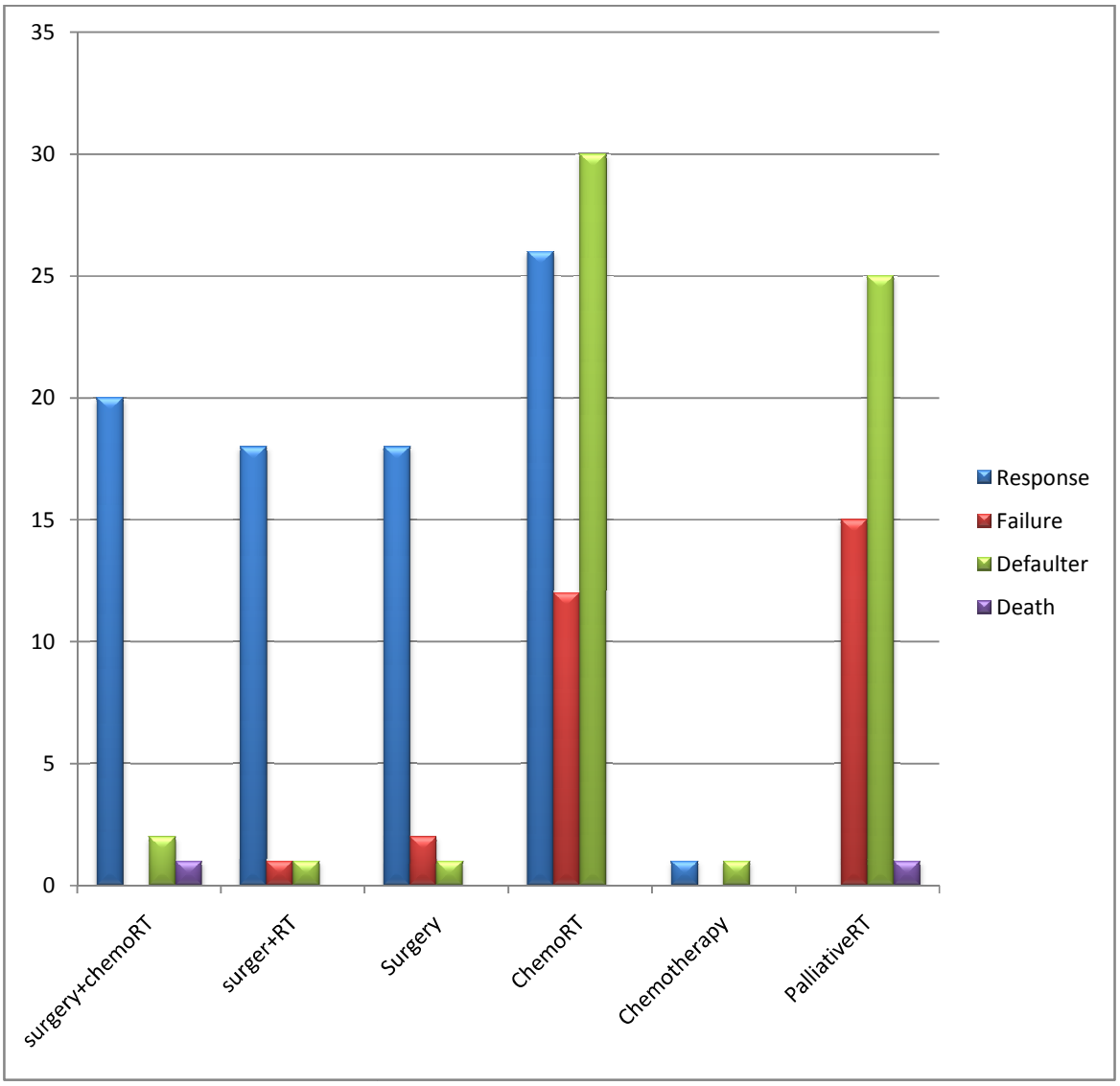


FIG.1&2. ANATOMY OF ORAL CAVITY

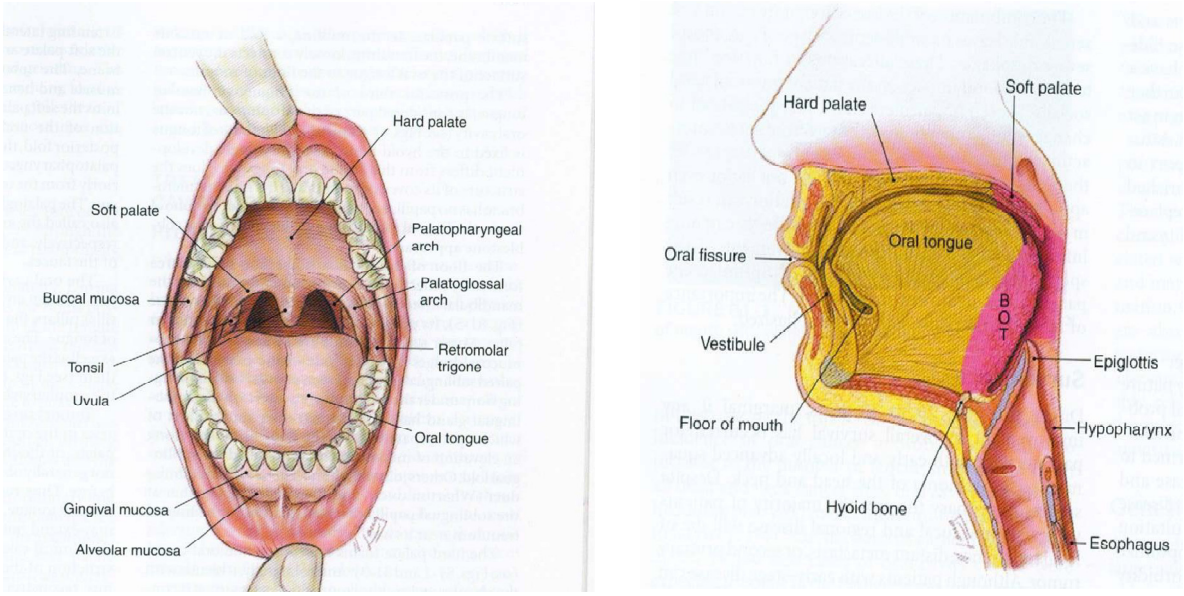


FIG.3. ORAL SUBMUCOUS FIBROSIS

FIG.4. LEUKOPLAKIA IN TONGUE

FIG.5. ADENOID CYSTIC CARCINOMA IN HARD PALATE

FIG.6. CARCINOMA BUCCAL MUCOSA PREOPERATIVE VIEW

FIG.7. CARCINOMA BUCCAL MUCOSA POSTOPERATIVE VIEW

FIG.11&12. CARCINOMA BUCCAL MUCOSA WITH OROCUTANEOUS FISTULA AND COMPOSITE RESECTION WITH RND

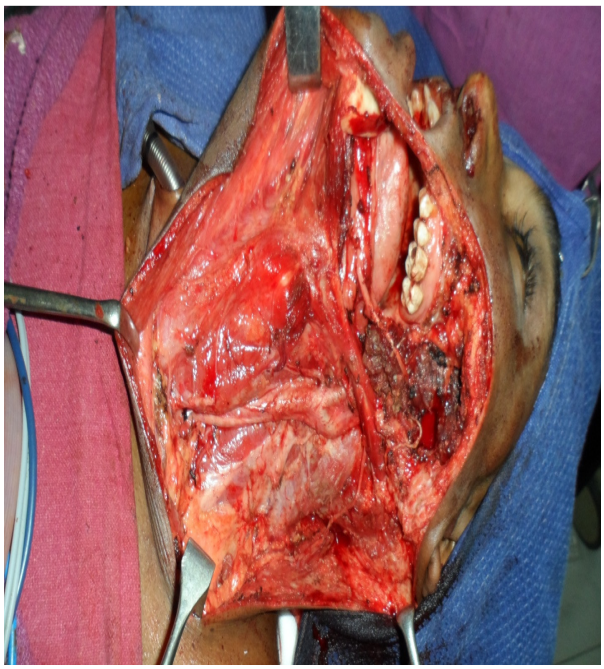


FIG.13. RECONSTRUCTION WITH PMMCF

FIG.14 &15. CARCINOMA TONGUE AND EXTENDED SUPRAOMOHYOID NECK DISSECTION

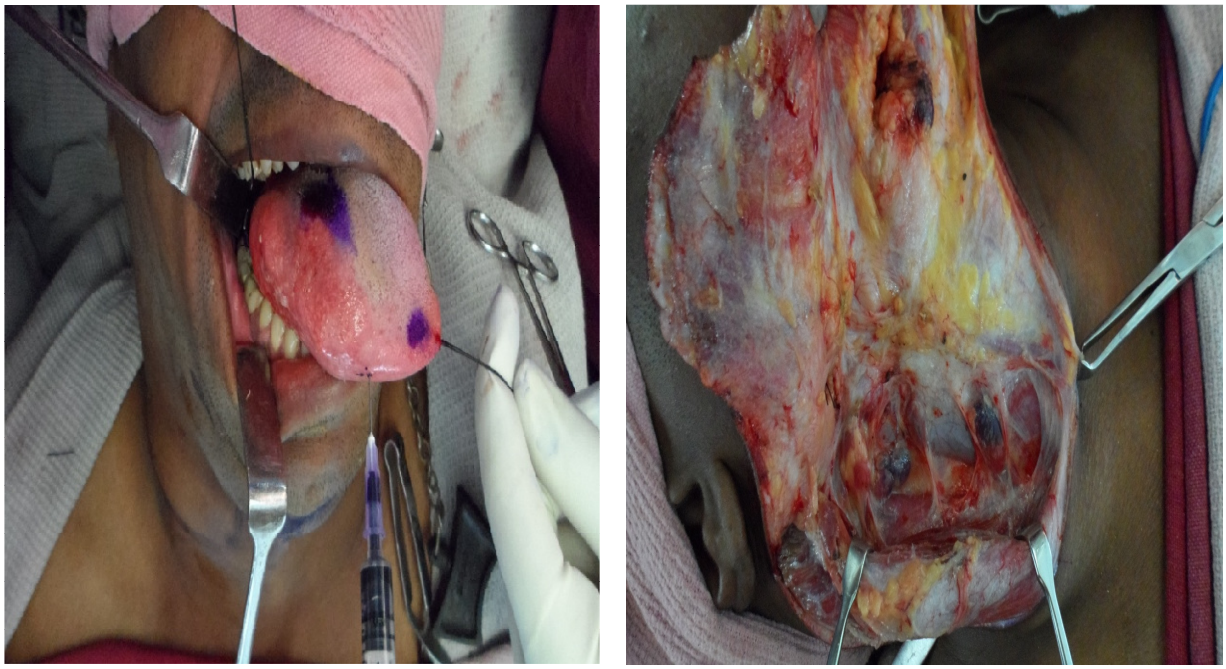


FIG.16. DURING HEMIGLASSECTOMY

FIG.8&9. CARCINOMA LOWER LIP PREOPERATIVE AND AFTER WIDE LOCAL EXCISION

FIG.10. CARCINOMA LIP AFTER RECONTRUTION WITH ERF

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PROFORMA

Name

Age

Sex

Occupation

Income

Address

Contact no

Socio economic status

IP no

Date of admission

Date of surgery

Date of discharge

TNM stage

Diagnosis

Symptoms:

1. Ulcer / Swelling / Growth
2. Pain / radiating pain
3. Bleeding
4. Excessive salivation
5. Change in voice
6. Alteration in taste
7. Loss of weight / appetite
8. Difficulty in mouth opening

9. Recent dental extraction

10. Any other complaints

Other co morbidities

DM / HT / TB / COPD

Risk factors

1. Chronic smoking

2. Alcohol abuse

3. Chronic betel nut & tobacco chewing

4. Sharp teeth & dentures

5. Chronic oral sepsis

6. Spicy food intake

7. Radiation exposure

Examination of oral cavity

Premalignant lesions:

1. Leukoplakia
2. Erythroplakia
3. Submucous fibrosis
4. Canidiasis

Site:

Lips – upper / lower / angle of mouth

Buccoalveolar sulci

Retromolar

Cheek

Alveolus – upper / lower

Tongue – anterior 2/3

Floor of mouth

Hard palate

Size

Extent

Type

Tenderness

Floor & base

Bleeds on touch

Mouth opening

Oral hygiene

Dental formula

Orocutaneous fistula

Nodal status

Investigation:

1. X-ray mandible

2. X-ray chest

3. CT – scan

4. Biopsy5. Fnac of node

Treatment:

Curative / Palliative

Neoadjuvant therapy

Surgery done:

RT – curative / palliative

Chemo – drugs, cycles, response

Outcome:

ABBREVATION

- FOM : Floor of mouth
- RMT : Retro molar trigone
- HP : Hard palate
- BM : Buccal mucosa
- U : Ulcer
- P : Pain
- S : Swelling
- ES : Excessive salivation
- D : Dysphagia
- T : Trismus
- RE : Retro molar extension
- OCF : Orocutaneous fistula
- DC : Difficulty in chewing
- LN : Lump neck
- AG : Ankyloglossia
- T : Tobacco
- S : Smoking
- A : Alcohol
- B : Betel nut
- PM LESIONS : Pre malignant lesions

- L : Leukoplakia
- E : Erythroplakia
- SMF : Sub mucosal fibrosis
- C : Candidiasis
- ND : Nutritional deficiency
- DF : Dental factors
- U : Ulcerative
- UP : Ulceroproliferative
- P : Proliferative
- SCC : Squamous cell carcinoma
- MM : Malignant melanoma
- VC : Verrucous carcinoma
- SE status : Socioeconomic status
- L : Low
- M : Middle
- WLE : Wide local excision
- HM : Hemimandibulectomy
- HG : Hemiglossectomy
- CR : Composite resection
- SOHND : Supraomohyoid neck dissection
- ESOHND : Extended supraomohyoid neck dissection

- RND : Radical neck dissection
- PMMCF : Pectoralis major myocutaneous flap
- ERF : Estlander rotating flap
- FHF : Forehead flap
- DPF : Deltopectoral flap
- NLF : Nasolabial flap
- CRT : Chemoradiotherapy
- POST CRT : Postoperative chemoradiotherapy
- PALRT : Palliative Radiotherapy
- CHEMORT : Chemoradiotherapy
- POSTRT : Postoperative Radiotherapy
- REC : Recurrence

MASTER CHART

S.NO	NAME	AGE	SEX	REG NO	SITE	TNM	SYMPTOMS	RISK FACTORS	PM LESIONS	SE STATUS	TYPE	GRADE	CLINICAL PATTERNS	TREATMENT	FOLLOW-UP
1	Ramaswamy	68	M	10759/11	Tongue-R	T2N2bM0	U,S	B,T	SMF	L	SCC	I	UP	HG,RND,POSTCRT	ASYMPTAM
2	Ganasekaran	53	M	10856/11	Buccal mucosa-L	T1N0M0	U,P,ES,DC	S,A	E	L	SCC	II	U	WLE,FHF	ASYMPTAM
3	Ibrahim ammal	68	F	21215/11	Tongue-L	T1N0M0	P,A,ES,U	B,T	SMF	L	SCC	II	U	WLE,SOHND	PROGR
4	Avadaichi	63	F	24078/11	Lip-Comm	T2N0M0	S	B,T	E	L	VC		P	WLE,FHF	ASYMPTAM
5	Ayyammal	60	F	25932/11	Lip-Lower	T4N2cM0	U,S	B,T	SMF	L	SCC	III	UP	PAL-RT	DEFAULT
6	Kamatchi	49	M	25994/11	Buccal mucosa-L	T4N2bM0	U	B,S		L	SCC	II	U	CHEMORT	DEFAULT
7	Ayyakal	53	M	27332/11	Tongue-L	T2N2bM0	U	B,S,A	L,E	L	SCC	I	U	HG,RND,POSTCRT	ASYMPTAM
8	Vellapillai	60	M	28340/11	Buccal mucosa-L	T3N1M0	U,S	B,T,S	L	L	SCC	I	UP	CHEMORT	ASYMPTAM
9	Chinnakannu	57	M	28418/11	Lip-Lower	T3N1M0	S,P,U	B,T,A	L	L	SCC	I	UP	CHEMORT	ASYMPTAM
10	Vellaiswamy	70	M	28529/11	Buccal mucosa-L	T1N1M0	U,S	B,T	L	L	SCC	I	UP	WLE,FHF,SOHND,POSTRT	DEFAULT
11	Ramalakshmi	40	F	32675/11	Tongue-L	T1N0M0	P,A,ES,U,S			L	SCC	II	UP	WLE,SOHND	DEFAULT
12	Jeyaram	58	M	33149/11	Buccal mucosa-R	T4N2bM0	U	B,T,A	L,E	L	SCC	II	U	CHEMORT	DEFAULT
13	Ganasekar	99	M	35186/11	Tongue-L	T2N2bM0	U,S			L	SCC	I	UP	HG,RND,POSTCRT	ASYMPTAM
14	Chandran	59	M	72032/12	Alveolus	T2N0M0	U,S	B,T,S	L	L	SCC	II	UP	HM,SOHND,PMMCF	DEFAULT
15	Ramaraj	61	M	35952/11	Tongue-L	T4N2bM0	U,S	B,T,S,A	L	L	SCC	II	UP	PAL-RT	DEFAULT
16	Chinniyan	42	M	36040/11	Lip-Lower	T1N0M0	S	S		L	VC		P	WLE,ERF	ASYMPTAM
17	Raman	75	M	38084/11	Tongue-R	T2N2bM0	U,S	B,T	C	L	SCC	I	UP	HG,RND,POSTCRT	ASYMPTAM
18	Angammal	65	F	38959/11	Buccal mucosa-L	T2N1M0	U	B,T	L	L	SCC	I	U	WLE,FHF,SOHND,POSTRT	ASYMPTAM
19	Thayammal	65	F	39886/11	FOM	T3N1M0	U,S.P	B,T	E	L	SCC	I	U	CHEMORT	ASYMPTAM
20	Sharmila	20	F	41077/11	Hard palate	T3N1M0	U,P			L	SCC	I	U	CHEMORT	ASYMPTAM
21	Haridoss	59	M	41531/11	Buccal mucosa-L	T4N2bM0	U,P,ES,DC	B,T,S	L	L	SCC	II	U	CHEMORT	DEFAULT
22	Selvanayagi	58	F	42175/11	Tongue-R	T1N1M0	U,S	B,T	L	L	SCC	I	UP	WLE,SOHND,POSTRT-HG	RECURRENCE
23	Rajendran	73	M	42668/11	Tongue-L	T4N3M0	U,LN	B,T	SMF	L	SCC	III	U	PAL-RT	DEFAULT
24	Dhanushram	58	M	44085/11	Tongue-R	T3N1M0	U,S	B,T,A	L	L	SCC	I	UP	CHEMORT	ASYMPTAM
25	Mariammal	48	F	44105/11	Alveolus	T2N0M0	U,P	B,T	L	L	SCC	II	U	HM,SOHND,PMMCF	ASYMPTAM
26	Jeyalakshmi	45	F	44110/11	Buccal mucosa-R	T2N0M0	S	B,T	L	L	VC		P	WLE,FHF	ASYMPTAM
27	Rajeswari	44	F	44154/11	Tongue-R	T1N1M0	P,A,ES,U,S	B,T	SMF,L,E	L	SCC	I	UP	HG,ESOHND,POSTRT	ASYMPTAM
28	Kamatchi	49	M	44359/11	Lip-Upper	T3N1M0	U	B,S		L	SCC	I	U	CHEMORT	ASYMPTAM
29	David	45	M	44642/11	Tongue-L	T2N0M0	U,S	S		L	SCC	I	UP	HG,SOHND,POSTRT	ASYMPTAM
30	Pandiyan	50	M	45803/11	Buccal mucosa-R	T4N2bM0	U,S,ES,DC	B,A		L	SCC	II	UP	CHEMORT	DEFAULT
31	Kuppuswamy	65	M	45863/11	Tongue-L	T4N2bM0	U	B,T	SMF,L,E	L	SCC	III	U	PAL-RT	DEFAULT
32	Ramesh Babu	48	M	47356/11	Tongue-R	T4N2cM0	U,S	B,S		L	SCC	III	UP	PAL-RT	DEATH

MASTER CHART

33	Kathirvel	75	M	48746/11	Tongue-R	T4N2bM0	ES,U	B,T		L	SCC	III	U	PAL-RT	DEFAULT
34	Ramalingam	50	M	49006/11	Hard palate	T3N1M0	U,P	B,A		L	SCC	I	U	CHEMORT	ASYMPTAM
35	Muthulakshmi	45	F	49050/11	Tongue-L	T4N2bM0	U	B,T	SMF	L	SCC	II	U	PAL-RT	DEFAULT
36	Thangamagil	47	F	49542/11	Alveolus	T3N1M0	U,S,P	B,T	L	L	SCC	I	UP	CHEMORT	ASYMPTAM
37	Vaithdurai	52	M	50270/11	Buccal mucosa-L	T4N2bM0	U,P,S,T,DC	B,S,A	E	L	SCC	II	UP	CHEMORT	DEFAULT
38	Saraswathi	67	F	50321/11	Buccal mucosa-R	T3N1M0	U,ES	B,T	E	L	SCC	I	U	CHEMORT	ASYMPTAM
39	keemba	75	F	50646/11	Alveolus	T3N1M0	U,P	B,T	L	L	SCC	I	U	CHEMORT	ASYMPTAM
40	Subbuthai	70	F	50858/11	Alveolus	T3N1M0	U	B,T	L	L	SCC	I	U	CHEMORT	ASYMPTAM
41	Mookammal	35	F	52034/11	Tongue-R	T2N2bM0	U			L	SCC	I	U	HG,RND,POSTCRT	ASYMPTAM
42	Chinnaponnu	50	F	52486/11	Buccal mucosa-L	T1N0M0	U,S,ES	B,T	L	L	SCC	II	UP	WLE,FHF	DEFAULT
43	Pandi	60	M	52555/11	Buccal mucosa-L	T3N1M0	U,S,ES	B,T,S	L	L	SCC	I	UP	CHEMORT	ASYMPTAM
44	Dharmar	48	M	52845/11	Buccal mucosa-R	T4N2cM0	U,P,S,ES,RE	B,S,A	SMF	L	SCC	III	UP	PAL-RT	DEFAULT
45	Venkatraman	77	M	53412/11	Tongue-R	T3N1M0	U	B,T	C	L	SCC	I	U	CHEMORT	ASYMPTAM
46	Periyaswamy	58	F	53728/11	Tongue-R	T4N2cM0	S,ES,U	B,T		L	SCC	III	UP	PAL-RT	DEFAULT
47	Leelavathi	40	F	53741/11	Buccal mucosa-L	T4N2cM0	U,S,ES,OCF			L	SCC	III	UP	PAL-RT	DEFAULT
48	Kalyiammal	65	F	54283/11	Buccal mucosa-R	T1N0M0	U,ES	B,T	E	L	SCC	II	U	WLE,FHF	ASYMPTAM
49	Shanmugam	48	M	54298/11	Tongue-R	T4N2bM0	U	B,S		L	SCC	II	U	PAL-RT	DEFAULT
50	Selvam	32	M	2766/12	Buccal mucosa-L	T2N0M0	U,S,ES	S,A	E	L	SCC	II	UP	WLE,FHF	ASYMPTAM
51	Thangavel	63	M	55692/11	Tongue-L	T2N2bM0	U,S	B,T,S,A	L	L	SCC	I	UP	HG,RND,POSTCRT	ASYMPTAM
52	Bhagavathy	62	F	56373/11	Tongue-R	T3N1M0	S,ES,U	B,T	C	L	SCC	I	UP	CHEMORT	ASYMPTAM
53	Neelamegam	33	M	56500/11	Buccal mucosa-R	T4N2bM0	U,RE	S,A		L	SCC	II	U	CHEMORT	DEFAULT
54	Arumugam	55	M	56535/11	Tongue-L	T4N3M0	U,LN	B,T,A	L	L	SCC	III	U	PAL-RT	DEFAULT
55	Parimala	57	F	56844/11	Tongue-R	T4N2bM0	ES,U	B,T	C	L	SCC	II	U	PAL-RT	DEFAULT
56	Lakshmi	56	F	56871/11	Tongue-L	T4N2bM0	U	B,T	L	L	SCC	II	U	PAL-RT	PROGR
57	Ponnuswamy	82	M	57323/11	Hard palate	T3N0M0	U,P	B,T	E	L	SCC	I	U	CHEMORT	ASYMPTAM
58	Arulmanickam	48	M	58412/11	Tongue-R	T2N0M0	P,A,ES,D,U	B,S		L	SCC	II	U	HG,SOHND	DEFAULT
59	Soundammal	60	F	58444/11	Lip-Lower	T2N0M0	U,S	B,T	E	L	SCC	I	UP	WLE,FHF	ASYMPTAM
60	Govindhammal	60	F	58724/11	Buccal mucosa-L	T3N1M0	U,S,ES	B,T	L	L	SCC	I	UP	CHEMORT	ASYMPTAM
61	Alagammal	60	F	58967/11	Alveolus	T4N2aM0	U,S,P	B,T	L	L	SCC	II	UP	CHEMORT,CR,PMMCF,RND	ASYMPTAM
62	Esaiyaiya Pillai	69	M	59893/11	Tongue-R	T3N1M0	U	B,T	C	L	SCC	I	U	CHEMORT	ASYMPTAM
63	Rathinam	65	F	60213/11	Buccal mucosa-R	T2N0M0	U	B,T	L	L	SCC	I	U	WLE,DPF	ASYMPTAM
64	Subbaiyan	58	M	60390/11	Buccal mucosa-R	T4N2bM0	U,RE	B,T,S	E	L	SCC	II	U	CHEMORT	DEFAULT
65	Alagachi	50	F	60771/11	Tongue-R	T4N2bM0	U	B,T	C	L	SCC	II	U	PAL-RT	PROGR

MASTER CHART

66	Marisamy	63	M	61180/11	Hard palate	T4N2bM0	U	B,T,S,A	L	L	SCC	II	U	PAL-RT	PROGR
67	Alagarswamy	70	M	61786/11	Tongue-R	T4N2cM0	S,ES,U	B,T		L	SCC	III	UP	PAL-RT	DEFAULT
68	Selvi	32	F	62322/11	Alveolus	T4N2aM0	U,S		L	L	SCC	II	UP	CHEMORT	DEFAULT
69	Murugammal	30	F	63657/11	Lip-Lower	T3N1M0	U			L	SCC	I	UP	CHEMORT	ASYMPTAM
70	Ayyadurai	65	M	63925/11	Tongue-L	T4N2bM0	U	B,T	SMF	L	SCC	III	U	PAL-RT	PROGR
71	Arumugan	67	M	65163/11	Buccal mucosa-R	T2N0M0	S	B,T	L	L	VC		P	WLE,DPF	ASYMPTAM
72	Sounthanadevi	63	F	66014/11	Buccal mucosa-R	T3N1M0	U,ES	B,T	L	L	SCC	I	U	CHEMORT	ASYMPTAM
73	Ponnamal	63	F	66187/11	Tongue-R	T2N0M0	ES,U	B,T	SMF	L	SCC	I	U	HG,SOHND,POSTRT	ASYMPTAM
74	Ramasamy	63	M	66292/11	Tongue-R	T2N2bM0	U	B,T,S,A	L,E,SMF	L	SCC	I	U	HG,RND-REC,CRT	RECURRENCE
75	Kattuva	35	M	66487/11	Tongue-L	T4N3M0	S,ES,U,LN	S,A		L	SCC	III	UP	PAL-RT	DEFAULT
76	Sheikh Dawood	47	M	66796/11	Buccal mucosa-R	T1N0M0	U	S		L	SCC	I	U	WLE-REC,RT	RECURRENCE
77	Palaniappan	51	M	68383/11	Buccal mucosa-L	T2N1M0	U,S,ES	B,A		L	SCC	I	UP	WLE,FHF,SOHND,POSTRT	ASYMPTAM
78	Rajammal	44	F	68528/11	Tongue-L	T1N1M0	U	B,T	SMF,L,E	L	SCC	I	U	HG,SOHND,POSTRT	RECURRENCE
79	Ramar	49	M	68543/11	Tongue-R	T3N1M0	S,ES,U	B,S		L	SCC	I	UP	CHEMORT	ASYMPTAM
80	Govindhaswamy	67	M	68729/11	Alveolus	T3N1M0	U,S,P	B,T		L	SCC	I	UP	CHEMORT,HM,PMMCF	ASYMPTAM
81	Selvam	48	M	68951/11	Tongue-R	T2N2bM0	U	B,S		L	SCC	I	U	HG,RND,POSTCRT	ASYMPTAM
82	Ganesan	55	M	69157/11	Buccal mucosa-R	T2N0M0	S,ES,DC	S,A		L	VC		P	WLE,FHF	ASYMPTAM
83	Veeramalai	57	M	69685/11	Hard palate	T3N0M0	U	B,T,A	L,E	L	SCC	I	U	CHEMORT	ASYMPTAM
84	Mohammed Hussain	60	M	69777/11	Buccal mucosa-L	T2N0M0	U,S,ES	B,T,S	SMF	L	SCC	II	UP	WLE,FHF	ASYMPTAM
85	Dhashamurthy	68	M	70583/11	Tongue-L	T4N2bM0	U	B,T	SMF	L	SCC	III	U	PAL-RT	PROGR
86	Manickam	40	M	70781/11	Buccal mucosa-R	T4N2aM0	U,P,ES,DC	S		L	SCC	II	U	CHEMORT,CR,PMMCF,RND	ASYMPTAM
87	Ponnuthai	70	F	71779/11	Buccal mucosa-L	T2N0M0	U,ES	B,T	SMF	L	SCC	II	U	WLE,FHF	ASYMPTAM
88	Malaikannan	61	M	74452/11	Hard palate	T3N1M0	U,S	B,T,S	L,E,SMF	L	SCC	I	UP	CHEMORT	DEFAULT
89	Jaleel Ahmed	32	M	74953/11	Tongue-R	T4N2bM0	S,ES,U	S,A		L	SCC	II	UP	PAL-RT	PROGR
90	Ramthai	50	F	75224/11	Buccal mucosa-R	T4N2bM0	U,ES,DS,OCF	B,T	E	L	SCC	II	U	PAL-RT	PROGR
91	Periyakarupppan	63	M	753/11	Tongue-L	T4N3M0	U,LN	B,T,S,A	E	L	SCC	III	U	PAL-RT	DEFAULT
92	Myilkalai	55	M	76589/11	Hard palate	T3N1M0	U,S	S,A		L	SCC	I	UP	CHEMORT	ASYMPTAM
93	Chinna Alagar	55	M	77593/11	Tongue-L	T4N2aM0	U	S,A		L	SCC	II	U	CHEMORT,HG,CR,RND,PMMCF	ASYMPTAM
94	Palaniammal	60	F	78712/11	Buccal mucosa-R	T2NIM0	U,ES	B,T	L	L	SCC	I	U	WLE,FHF,SOHND,POSTRT	ASYMPTAM
95	Jeganathan	75	M	79387/11	Buccal mucosa-L	T3N1M0	U,ES,DC	B,T	L	L	SCC	I	U	CHEMORT,WLE,FHF,SOHND	ASYMPTAM
96	Bashha	58	M	79488/11	Tongue-R	T3N1M0	ES,U	B,T,A	L	L	SCC	I	U	CHEMORT,HG,SOHND	ASYMPTAM
97	Rajaram	63	M	79678/11	Lip-Lower	T3N1M0	S,P,U	B,T,S,A	L	L	SCC	I	UP	CHEMORT,WLE,ERF,SOHND	ASYMPTAM
98	Palaniswamy	51	M	79834/11	Buccal mucosa-R	T4N2bM0	U,S,RE,OCF	B,A		L	SCC	II	UP	PAL-RT	PROGR

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99	Ponnan	68	M	79926/11	Buccal mucosa-L	T4N2aM0	U,DS	B,T	L	L	SCC	II	U	CHEMORT,CR,PMMCF,RND	ASYMPTAM
100	Murugesan	54	M	8026/11	Hard palate	T2N0M0	S	S,A		L	ACA		P	WLE	ASYMPTAM
101	Muvuyammal	31	F	80354/11	Lip-Lower	T3N1M0	U			L	SCC	I	U	CHEMORT,WLE,ERF,SOHND	ASYMPTAM
102	Rajamanickam	67	M	81891/11	Alveolus	T4N2aM0	U,RE	B,T	L	L	SCC	II	U	CHEMORT	DEFAULT
103	Balasubramaniyan	53	M	81917/11	FOM	T2N2M0	U,P	S,A		L	SCC	I	U	CHEMORT	ASYMPTAM
104	Muthulakshmi	55	F	83729/11	Alveolus	T4N2aM0	U,S,P,T,RE	B,T	L	L	SCC	II	UP	CHEMORT	DEFAULT
105	Suruli	49	M	84010/11	Buccal mucosa-R	T4N2bM0	U,S,RE	B,A		L	SCC	II	UP	PAL-RT	PROGR
106	Karuppiah	59	M	90289/11	Tongue-L	T4N2bM0	U	B,T,S	L,E	L	SCC	II	U	PAL-RT	PROGR
107	Perumaldesar	85	M	90690/11	Alveolus	T3N1M0	U			L	SCC	I	U	CHEMORT	DEFAULT
108	Dhanabalan	52	M	92829/11	Buccal mucosa-L	T3N1M0	U,DC	B,S,A	E	L	SCC	I	U	CHEMORT	DEFAULT
109	Rajan	55	M	10986/12	Buccal mucosa-R	T4N2bM0	U	S,A		L	SCC	II	U	WLE,HM,PMMCF,RND,POSTCRT	RECURRENCE
110	Duraipandi	61	M	11016/12	Alveolus	T3N1M0	U	B,T,S	L	L	SCC	I	U	CHEMORT	DEFAULT
111	Balasubramani	50	M	1133/12	Buccal mucosa-L	T4N2bM0	U,P,T,RE	B,A		L	SCC	II	U	PAL-RT	PROGR
112	Guruswamy	65	M	12713/12	Tongue-L	T1N0M0	U	B,T,S,A	L	L	SCC	I	U	WLE,SOHND,POSTRT	ASYMPTAM
113	Arokkiayammal	58	F	16714/12	Hard palate	T3N0M0	U,S	B,T	E	L	SCC	I	UP	CHEMORT	ASYMPTAM
114	Mariyammal	65	F	16965/12	Buccal mucosa-R	T3N1M0	U,DS	B,T	L	L	SCC	I	U	CHEMORT	DEFAULT
115	Nagammal	50	F	17963/12	Buccal mucosa-L	T4N2bM0	U,P,T,RE	B,T	L	L	SCC	II	U	PAL-RT	PROGR
116	Balu	88	M	182303/12	Buccal mucosa-R	T4N2bM0	U,S			L	MM			CHEMO	DEFAULT
117	Palanivel	56	M	18512/12	Tongue-R	T2N0M0	P,A,ES,D,U	B,T,A	L	L	SCC	II	U	HG,SOHND	DEFAULT
118	Gandhi	70	M	18962/12	Hard palate	T3N0M0	U,S	B,T	E	L	SCC	I	UP	CHEMORT	ASYMPTAM
119	Lakshmi	55	F	19363/12	FOM	T4N2cM0	U,P	B,T	E	L	SCC	III	UP	PAL-RT	DEFAULT
120	Sellammal	45	F	19607/12	Alveolus	T4N2bM0	U,S	B,T	L	L	SCC	II	UP	CHEMORT,CR,PMMCF,RND	ASYMPTAM
121	Sathasivam	60	M	19876/12	Tongue-R	T4N2bM0	U	B,T,S	L,E	L	SCC	II	U	PAL-RT	DFFAULT
122	Janammal	70	M	1988/12	Tongue-L	T4N2aM0	P,A,ES,D,U	B,T	SMF	L	SCC	II	U	CHEMORT,HG,CR,RND,PMMCF	DEFAULT
123	Veeraiya	47	M	20044/12	Tongue-L	T4N2cM0	P,A,ES,D,U	S		L	SCC	III	U	PAL-RT	DEFAULT
124	Nagarajan	65	M	21757/12	Buccal mucosa-L	T4N2bM0	U,OCF	B,T	L	L	SCC	III	U	PAL-RT	PROGR
125	Ram	32	M	21761/12	Buccal mucosa-R	T4N2bM0	U,P,T,RE	S,A		L	SCC	II	U	PAL-RT	PROGR
126	Veeranan	52	M	2205/12	Buccal mucosa-L	T4N2bM0	U,S,OCF	B,S,A	E	L	SCC	II	UP	PAL-RT	PROGR
127	Palanikumar	31	M	23134/12	Buccal mucosa-L	T4N2bM0	U	S,A	E	L	SCC	II	U	CHEMORT,CR,PMMCF,RND	ASYMPTAM
128	Ampujam	60	F	24313/12	Buccal mucosa-R	T3N1M0	U	B,T	L	L	SCC	I	U	CHEMORT	DEFAULT
129	Muthupandi	65	F	24625/12	Buccal mucosa-R	T3N1M0	U	B,T	L	L	SCC	I	U	CHEMORT	DEFAULT
130	Ravikannan	40	M	24876/12	Buccal mucosa-L	T3N1M0	U	S		L	SCC	I	U	CHEMORT	DEFAULT
131	Duraisamy	67	F	24894/12	Tongue-R	T4N2bM0	U	B,T		L	SCC	III	U	PAL-RT	DEFAULT

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132	Sengi	51	F	25697/12	Tongue-L	T2N2bM0	U	B,T	SMF	L	SCC	I	U	HG,RND,POSTCRT	ASYMPTAM
133	Subramaniyan	63	M	26548/12	Tongue-R	T4N2cM0	P,A,ES,D,U	B,T,S,A	L,E	L	SCC	III	U	PAL-RT	DEFAULT
134	Mary	27	F	29108/12	Tongue-R	T4N2bM0	U			L	SCC	II	U	PAL-RT	DEFAULT
135	Pandiraj	67	M	30562/12	Buccal mucosa-R	T2N0M0	S	B,T	L	M	VC		P	WLE,NLF	ASYMPTAM
136	Sellambayiammal	60	F	30583/12	Lip-Lower	T4N2cM0	U,S	B,T	SMF,L,E	L	SCC	III	U	PAL-RT	DEFAULT
137	Kannammal	55	F	31919/12	Alveolus	T3N1M0	U,S	B,T	L	L	SCC	I	UP	CHEMORT	DEFAULT
138	Kamayam	66	F	34541/12	Alveolus	T3N1M0	U,S	B,T	L	L	SCC	I	UP	CHEMORT	DEFAULT
139	Gabriel	75	M	34743/12	Buccal mucosa-L	T3N1M0	U,S	B,T	L	L	SCC	I	UP	CHEMORT	DEFAULT
140	Pathar jems	75	M	34755/12	Tongue-R	T2N0M0	U	B,T	C	L	SCC	II	U	HG,SOHND	DEFAULT
141	Kamalam	58	F	35899/12	Buccal mucosa-R	T2N1M0	U	B,T	L	L	SCC	I	U	WLE,FHF,SOHND,POSTRT	ASYMPTAM
142	Madathi	75	F	35903/12	Buccal mucosa-L	T2N1M0	U	B,T	L	L	SCC	I	U	WLE,FHF,SOHND,POSTRT	ASYMPTAM
143	Jothi	65	F	40655/12	Tongue-R	T2N0M0	U	B,T	SMF	L	SCC	I	U	HG,SOHND,POSTRT	ASYMPTAM
144	Mariyappan	55	M	41468/12	Tongue-L	T4N2cM0	P,A,ES,D,U	S,A		L	SCC	III	U	PAL-RT	DEFAULT
145	Periyairulan	63	M	416266/12	Buccal mucosa-L	T2N2bM0	U,S	B,T,S,A	L	L	SCC	I	UP	WLE,DPF,RND,POSTCRT	RECURRENCE
146	Katherasen	35	M	42621/12	FOM	T4N2cM0	U,S	S,A		L	SCC	III	UP	PAL-RT	DEFAULT
147	Sadaiyan	65	M	44144/12	Tongue-L	T4N2aM0	U	B,T,S,A	L	L	SCC	II	U	HG,HM,RND,PMMCF,POSTCRT	DEATH
148	Karuppayee	70	F	48441/12	Buccal mucosa-L	T4N2bM0	U	B,T	L	L	SCC	III	U	CHEMORT	DEFAULT
149	Karrupasamy	65	M	50577/12	Hard palate	T4N2aM0	U,S	B,T,S,A	L	L	SCC	II	UP	CHEMORT	DEFAULT
150	Kattayan	26	M	53062/12	Buccal mucosa-L	T4N2bM0	U			L	SCC	II	U	CHEMORT	DEFAULT
151	Magalakshmi	35	F	53217/12	Buccal mucosa-L	T2N0M0	U			L	SCC	I	U	WLE,FHF	ASYMPTAM
152	Muthuraman	52	M	53700/12	Tongue-R	T3N1M0	U	B,S,A	L,E	L	SCC	I	U	CHEMORT	DEFAULT
153	Rakkammal	60	F	54238/12	Buccal mucosa-L	T3N1M0	U	B,T	L	L	SCC	I	U	CHEMORT	DEFAULT
154	Myileswari	40	F	54612/12	Lip-Upper	T2N0M0	S			L	ACA		P	WLE,AF-FHF	ASYMPTAM
155	Nagalingam	72	M	56031/12	RMT	T3N0M0	P,T,U	B,T	SMF	L	SCC	I	U	CHEMORT	ASYMPTAM
156	Ezhaikkal	51	F	56031/12	Buccal mucosa-L	T4N2bM0	U,P,T,DC	B,T	L	L	SCC	II	U	CHEMORT	DEFAULT
157	Subbulaksmi	61	F	56483/12	Hard palate	T2N0M0	S	B,T	E	L	ACA		P	WLE	DEFAULT
158	Kader basha	55	M	56877/12	Hard palate	T4N2bM0	U	S,A		L	SCC	II	U	CHEMORT	DEFAULT
159	Arputhamary	65	F	56877/12	Buccal mucosa-L	T2N0M0	U	B,T	L	L	SCC	I	U	WLE,FHF	ASYMPTAM
160	Muniyasamy	63	M	59886/12	Tongue-R	T4N2cM0	P,A,ES,D,U	B,T,S,A	L,E	L	SCC	III	U	PAL-RT	DEFAULT
161	Chinnathambi	55	M	71061/12	Alveolus	T4N2aM0	U,T,RE	S,A	E	L	SCC	II	U	CHEMORT	DEFAULT
162	Nattan	72	M	71562/12	Hard palate	T4N2aM0	U,S	B,T	E	L	SCC	II	UP	CHEMORT	DEFAULT